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Nuclear Developments

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Nuclear Developments

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CONTENTS

28 MARCH 1989

SUB-SAHARAN AFRICA

SOUTH AFRICA

Witwatersrand Receives Nuclear Accelerator [SAPA] 1

CHINA

Soviets Offer Help With Plant Construction [HONGKONG STANDARD 8 Mar] 2
Nuclear Corp. Delegation Sent to Chile [XINHUA] 2
Chile Welcomes Nuclear Corp. Delegation [XINHUA] 2

EAST ASIA

SOUTH KOREA

Uranium Imports From China Considered [THE KOREA TIMES 28 Feb] 3

EAST EUROPE

POLAND

Institute Director Defends Energy Development [ZOLNIERZ WOLNOSCI 28-29 Jan] 4
Chernobyl Continues To Figure in Nuclear Energy Reservations [WPROST 5 Feb] 5

ROMANIA

Ceausescu Visits Carnavoda Power Plant Site [AGERPRES] 8

LATIN AMERICA

CHILE

Cooperation Agreement To Be Signed With PRC [Santiago Radio] 10

NEAR EAST & SOUTH ASIA

INTERNATIONAL

First Conference of Arab Nuclear Authority Described [Kuwait AL-WATAN 1 Dec] 11
Pact Between India, Asian Nations Urged [Bombay THE TIMES OF INDIA 6 Jan] 12
Egypt, Morocco Sign Energy Protocol [Cairo AL-AKHBAR 1 Feb] 14
Egypt Reportedly Researches Weapons With Argentina, Iraq [Tel Aviv DAVAR 5 Feb] 14

EGYPT

Rebuilding of Iraqi Reactor Denied [MENA] 17

INDIA

Concern Expressed Over Pakistani Missile Tests [THE HINDUSTAN TIMES 28 Feb] 17
Cracks in Rotor Blade Force Madras Reactor Shutdown [THE HINDU 23 Dec] 18
Narora Power Project Attains 'Criticality' [Delhi Radio] 19
Further Details on Narora Nuclear Plant [Delhi TV] 19

New Units Added to Rajasthan Power Station <i>[Delhi Radio]</i>	19
Promotion of Nuclear Power Plants Emphasized <i>[Delhi International]</i>	19
Nuclear Fuel Complex Planned in Tamil Nadu <i>[Delhi Radio]</i>	20
IRAN	
Diplomatic Sources Cite PRC Aid on Missile Plant <i>[Tokyo KYODO]</i>	20
PAKISTAN	
Editorials Attack U.S. Nuclear Stance	20
Relationship 'Tenuous' <i>[DAWN 3 Feb]</i>	20
U.S. 'Doublespeak' Noted <i>[THE MUSLIM 31 Jan]</i>	21
Editorial Urges U.S. To Revise Views <i>[HAIDER 26 Feb]</i>	21
Official on Talks With USSR for Atomic Plant <i>[Islamabad Radio]</i>	21
Plan To Exploit Afghan Uranium Alleged <i>[Moscow Radio Peace and Progress]</i>	22
Nuclear Effort Defended; 'No Intention' for Bomb <i>[DAWN 11 Feb]</i>	22
Minister Claims To Have Been 'Misquoted' on Atomic Plant <i>[Islamabad Radio]</i>	25
Editorial Commends Successful Missile Tests <i>[DAWN 13 Feb]</i>	25
SOVIET UNION	
International Reactor Safety Seminar in Ukraine <i>[TASS]</i>	26
Power Plant Council of Directors Formed <i>[Moscow International]</i>	26
Official Denies Plans for Voronezh Waste Site <i>[PRAVDA 1 Mar]</i>	26
WEST EUROPE	
CANADA	
Possible Export of Ontario Tritium to U.S. Stirs Debate	28
Leak of Government Document <i>[THE TORONTO STAR 15 Feb]</i>	28
GLOBE AND MAIL Editorial <i>[THE GLOBE AND MAIL 16 Feb]</i>	28
Views Given on Nuclear Submarines After Cabinet Change	29
Hope of Opponents <i>[THE GLOBE AND MAIL 31 Jan]</i>	29
View of Proponents <i>[THE GLOBE AND MAIL 1 Feb]</i>	29
Discussion of Alternatives <i>[THE TORONTO STAR 3 Feb]</i>	30
Public Opinion Poll <i>[THE GLOBE AND MAIL 6 Feb]</i>	31
AECB Proposes To Pass On Regulatory Costs to Customers <i>[THE GLOBE AND MAIL 14 Feb]</i> ..	32
FEDERAL REPUBLIC OF GERMANY	
Nuclear Center Contacts With Pakistan <i>[DER SPIEGEL 27 Feb]</i>	33
Controls Tightened on Technological Exports <i>[DPA]</i>	34
SWEDEN	
Weapons Technology Export Controls Considered <i>[DAGENS NYHETER 17 Feb]</i>	34

SOUTH AFRICA

Witwatersrand Receives Nuclear Accelerator
*MB0103102089 Johannesburg SAPA in English
0942 GMT 1 Mar 89*

[Text] The University of the Witwatersrand [Wits] has been presented with a Van de Graaff 2.5 MV nuclear accelerator worth more than R2-million.

Potchefstroom University, in the spirit of rationalisation, is closing down its nuclear structure laboratory and has donated its machine to Wits and the Schonland Research Centre.

Soviets Offer Help With Plant Construction
*HK0803072989 Hong Kong HONGKONG STANDARD
in English 8 Mar 89 p 7*

[Article by Tammy Tam in Guangzhou]

[Excerpt] The Soviet Union is marching back into the huge China market, and a key area of interest is Beijing's nuclear power plans.

The Soviets have already agreed to sell two nuclear power plants to China's northeast province of Liaoning, but a senior Soviet official said yesterday Moscow hoped that was only a start.

As China wrestles with a severe energy shortage, the Soviets hope to help with construction of a number of plants, said Anatoly Litiagin, Moscow's deputy trade representative in Beijing.

"A Soviet delegation of nuclear power experts will come to China later this month to exchange technology of nuclear power with Chinese experts," said Mr Litiagin, visiting Guangzhou with a Soviet delegation to a symposium on subway construction.

He said the Liaoning deal "is only a primary stage proposal. But I must say that the Soviet Union is very interested in helping China to develop its nuclear power industry. That's why the Soviet delegation will come later this month."

Mr Litiagin said that after the Chernobyl nuclear accident Moscow carefully reexamined its nuclear equipment and technology.

"We are keeping our nuclear plant safe, and we'll have no reservations when we transfer our technologies to China. We'll tell them everything and show them all of our equipment." [passage omitted]

Nuclear Corp. Delegation Sent to Chile
*OW0903081289 Beijing XINHUA in English
0121 GMT 9 Mar 89*

[Summary] China sent to Chile a delegation from the China National Nuclear Corp. led by the company's president, Jiang Xinxiang. The delegation was sent in response to an invitation from Chile. The purpose of the visit is to seek scientific and technical cooperation between the two countries on the peaceful uses of nuclear energy. The delegation arrived in Santiago on 8 March and was received by Chile's President, Augusto Pinochet.

Chile Welcomes Nuclear Corp. Delegation
*OW0903081289 Beijing XINHUA in English
0121 GMT 9 Mar 89*

[Text] Santiago, March 8 (XINHUA)—Chile's President Augusto Pinochet today received a delegation from China National Nuclear Corp. led by the company's president, Jiang Xinxiang, at the presidential palace.

President Pinochet had a friendly chat with the Chinese guests.

This morning Chile's Foreign Minister Felipe Errazuriz met with the head of the Chinese delegation and his entourage at the Foreign Ministry.

The delegation was invited to Chile with the aim of seeking scientific and technical cooperation between the two countries on the use of nuclear energy for peaceful purposes.

SOUTH KOREA

Uranium Imports From China Considered

SK2802014089 Seoul *THE KOREA TIMES* in English
28 Feb 89 p 6

[Text] The government is reportedly considering importing enriched uranium from China as Beijing has conveyed through an American brokerage company its desire to export uranium to Korea.

According to the Energy-Resources Ministry and the Korea Electric Power Corp. (KEPCO) yesterday, China has expressed hopes of selling its uranium to Korea at spot market prices through Nuexco, the U.S. company dealing in uranium.

The government is learned to have replied that it would buy Chinese uranium if the price is reasonable.

A couple weeks ago the government reportedly said it would consider importing Soviet enriched uranium for use at nuclear power plants.

Recently, KEPCO has been under fire for importing enriched uranium at relatively high prices from the U.S. and France, bound by a long-term purchase contract.

Currently, China has no nuclear power plants though it completed experimentation on nuclear weapons in 1960's and is building 2 stations, forcing it to export its uranium to European countries.

POLAND

Institute Director Defends Energy Development
26000339b Warsaw ZOLNIERZ WOLNOSCI in Polish
28-29 Jan 89 p 4

[Interview with Prof Jerzy Michalik, director, Institute of Atomic Energy, by Dr Piotr Mikolajewski: "A Curse or an Opportunity?"; date and place not given]

[Text]

[ZOLNIERZ WOLNOSCI] The nuclear power industry is rather universally viewed as the curse of our century.

[Michalik] Unfairly so. To very many countries it is the only way to develop their power industry; in Poland, too, where power demand is rising and shall continue to rise and can be met in no other way except by building nuclear power plants. Otherwise, we will be menaced by an energy crisis whose symptoms already are perceptible.

[ZOLNIERZ WOLNOSCI] Are not you expressing an... ex officio opinion?

[Michalik] No, because the Institute of Atomic Energy is precisely investigating the safety of nuclear power plants. Nowadays 400 nuclear reactors generating 15 percent of the world's electrical power output are operating in 31 countries. More than 100 new reactors have been ordered. In some countries, especially in the developed ones, a substantial part of energy is generated by nuclear power plants: 72 percent in France, 57 percent in Belgium, 40 percent in Bulgaria, and 36 percent in the FRG.

[ZOLNIERZ WOLNOSCI] Only rich countries can afford nuclear energy.

[Michalik] Indeed, building a nuclear power plant costs two to three times as much as a conventional one. But if we make allowance for the cost of building associated new railroad lines and transporting fossil fuels as well as for the cost of building new transmission lines, and also for the cost of energy losses when new conventional power plants are sited in the neighborhood of fuel extraction sites, it turns out that the unit cost of energy generation is, chiefly owing to the prices of fossil fuel, lower for nuclear energy.

[ZOLNIERZ WOLNOSCI] Not everything can be considered in terms of money. People are terrified by the perils to natural environment.

[Michalik] But no one is terrified by the considerable quantities of sulfur and nitrogen compounds emitted by conventional power generation. This results in not only degradation of natural environment but also acid rain that destroys forests and causes soil acidity over considerable distances. Statistics show that the lifespan of people inhabiting the areas generating energy from coal is simply shorter. Let us also bear in mind that both

black and brown coal contain radioactive elements (chiefly uranium and thorium) which, as a result of the burning of coal, penetrate the atmosphere and ash dumps. My calculations show that during the postwar 40 years conventional power industry has released in our country one-half as much radioactivity as was generated by the Chernobyl disaster. Nuclear power plants are not an environmental peril.

[ZOLNIERZ WOLNOSCI] As much as one-half.... but that means one-half of the radioactivity caused by nuclear reactor breakdowns, yet these breakdowns cannot be precluded.

[Michalik] The problem of safety is indeed fundamental. That is precisely why investment outlays on nuclear power are so high. About 50-60 percent of the cost of building a nuclear power plant goes for solutions assuring its operating safety. A nuclear power reactor is not, and in no way can be, an atomic bomb. This cannot happen owing to the reactor's operating technology, and neither is it possible owing to the too low level of enrichment of the nuclear fuel in the reactor.

[ZOLNIERZ WOLNOSCI] It is hard to believe that a nuclear reactor is safest.

[Michalik] Let me first explain how it operates. The fission of uranium generates heat which is taken up by the coolant, most often water. The resulting thermal energy is utilized to generate steam which drives the turbines rotating the generators of electrical energy. What can happen? The worst is the loss of possibility of cooling the nuclear-fuel rods, which might result in that, despite the disconnection of the reactor, these rods become heated to such a high temperature (1,600-1,700 degrees Centigrade) that, as a result, they get melted. This in its turn causes the release of radioactive fission products of uranium, which may escape from the reactor.

[ZOLNIERZ WOLNOSCI] And the disaster happens!

[Michalik] Not so fast. To counteract such events, reactors are equipped with emergency systems for cooling the fuel rods. Nuclear power plants usually include four barriers preventing radioactive materials from escaping from the reactor and penetrating outside the power plant. The first barrier is the fuel itself, which is so designed that the fission products of uranium remain inside it and lack any (either mechanical or physical) possibility of leaving the fuel rod. In addition, there is a casing made of a special alloy, a metal cylinder, constituting the next barrier. Even if the possibility of cooling the fuel rods is forfeited and both these barriers prove insufficient, which is hardly likely and can occur only in the presence of so-called maximum breakdown, we still have two more safeguards, because the reactor is encased in a steel tank and a reinforced-concrete shielding.

[ZOLNIERZ WOLNOSCI] Yet, despite these ingenious and costly safeguards, breakdowns do occur in nuclear power plants. In 1975 there was that terrible fire at the Browns Ferry Nuclear Power Plant in the United States. Four years later, also in the United States, a menacing leak occurred at the Three Mile Island Plant, and in 1986 there occurred the most menacing of all such disasters so far—the breakdown of the Soviet nuclear power plant in Chernobyl.

[Michalik] In all these cases the breakdown was caused by a combination of technical flaws and mistakes by servicing personnel. Nevertheless, the safeguards proved to be so good that tragedy was prevented. The 7-hour fire at Browns Ferry and the burnout of a huge quantity of cable, which had largely neutralized the remote control and safety systems, did not menace the reactors. All that time they had remained well-cooled and their fuel was in no way damaged and no fission products escaped from the reactors. At Three Mile Island the radioactive materials were stopped by the fourth safeguard—the reactor shielding. Only in the case of Chernobyl there was radioactive contamination of the environment, and that solely owing to many mistakes by the servicing personnel, contrary to operating and maintenance rules, as well as owing to the absence of that fourth barrier—an all-encompassing reactor shielding.

[ZOLNIERZ WOLNOSCI] Who will guarantee to us that in building Polish nuclear power plants we shall avoid technical flaws and mistakes by servicing personnel?

[Michalik] Both the nuclear power plant being built in Zarnowiec and the one which will arise in Klempicz will be provided with reactors of a type different from the complex graphite-channel reactor installed in Chernobyl. They will be pressurized-water reactors, which are widely and reliably used throughout the world. The designs of all the four barriers-safeguards for these reactors are the best and tried and tested, and they have been further improved to assure halting reactor operation at any moment. There also exist special organizational systems for the selection, training, and supervision of the operating personnel as well as for monitoring the construction and operation of nuclear power plants. The latter is always performed by the government, regardless of whether the plant investor is or is not private. Then also there is always the possibility of an inspection by the International Atomic Energy Agency.

[ZOLNIERZ WOLNOSCI] Good. But there still remains the problem of the safety of storing radioactive wastes. They cannot be simply dumped.

[Michalik] These wastes differ greatly in level of radioactivity. The radioactivity level of a spent fuel rod differs from that of the clothing of a nuclear power plant attendant. It is the spent fuel that causes the most serious safety problems with respect to radioactive wastes. In Poland we are not and shall not be facing this problem,

because the spent rods will be picked up by from us by their supplier, the USSR, which itself attends to their processing and safe storage. Our concern is thus rather with the objects, materials, or equipment parts which might even only potentially be subject to low irradiation or contamination. They all are subject to suitable processing. They are packed together in special containers preventing them from penetrating the natural environment. These wastes are usually immersed in molten glass, asphalt, or concrete and placed in special barrels or noncorrosive metal containers and only then transported to their storage sites, sites which are selected with thorough attention to even tectonic and hydrological conditions.

[ZOLNIERZ WOLNOSCI] Since a nuclear power industry in Poland is inevitable, and the designs used assure safety of its growth, why is it that some of the highly developed countries have slowed down their pace of expansion of that industry?

[Michalik] Certain countries have indeed reduced the number of nuclear power plants in construction, but that was done only by the countries with a surplus of electrical energy. Not only Poland but most other countries lack an alternative to the expansion of nuclear power, owing to the limited reserves of fossil fuels, whose burning in power boilers essentially means a waste of these resources. Neither arguments of cost nor ecological arguments, nor those ensuing from fears about safety, are substantive. In the United States already 98 nuclear reactors operate, and the probability of a death accident linked to their operation is estimated to be on par with the probability of death due to... a falling meteorite! We could of course reject reason and stick to purely emotional resistance to the growth of nuclear power, but even if we abandoned the idea of building nuclear power stations in Poland, we would still remain within the scope of the nuclear power stations operating in the neighbor countries around us—in all the neighbor countries, even those "overseas," in Sweden. The only thing we actually are accomplishing is to restrict markedly the growth potential of our country without thereby even isolating ourselves from the problems associated with the utilization of nuclear power.

[ZOLNIERZ WOLNOSCI] Thank you for the interview.

Chernobyl Continues To Figure in Nuclear Energy Reservations

*26000339z Poznan WPROST in Polish
No 6, 5 Feb 89 pp 14-17*

[Article by Paweł Szpecht: "Atomic Neurosis"]

[Excerpts] [Passage omitted] The disaster in Chernobyl is considered as one of the so-called maximum breakdowns. [passage omitted]

The wind-driven cloud above Chernobyl moved westward. After several dozen hours the first northern wave reached the northeastern regions of Poland. The second, southern, arrived somewhat later, spreading over the voivodships bordering on Czechoslovakia. In the opinion of experts, it was more menacing, and it contained more cesium, too.

The first to learn about the breakdown at Chernobyl were the people listening to Polish-language Western

radio broadcasts. Anxiety grew, the more so considering that the official sources remained stubbornly silent. [passage omitted]

During the next few days the mass media continued to calm public opinion, assuring it that there was no peril to health and, the more so, life. Yet tests conducted in, e.g., Poznan revealed something completely different.

Subject	Before the Disaster	Quantity of Radiation				
		29 Apr	30 Apr	1 May	2 May	10 May
Air (in Bq/cu m)	1	500,000				
Surface water (in Bq/cu dm)	0.7	40	89	103	417	29.8
Tapwater (in Bq/cu dm)	0.4	48	74	101	111	4.7
Grass (in Bq/sq m)	223		50,000	105,000	87,000	23,000
Milk (in Bq/cu dm)	42		2,000	1,770		1,633
Vegetables	132		6,800	21,000	82,000	9,500

Activists from the Polish Ecological Club to this day have many complaints about the performance of the government commission headed by Deputy Prime Minister Zbigniew Szalajda. In their opinion, out of the fear of causing a panic, the public was not informed promptly and thoroughly about what should be done and what should not. No one ordered the closing of schools for at least a dozen days or so, and no one recommended to the people, above all to children and pregnant women, that they stay home, although that was done in the considerably less imperiled Yugoslavia. On the contrary, on May Day many persons ventured outside to participate in parades, although precisely then the ground-based contamination, at heights of up to 1 and 1/2 meters, was considerable. No one had officially recommended changing clothing daily and taking showers in order to avoid burns. The mistakes were repeated later as well, in the fall, when no resolute warnings against mushroom-gathering were issued. And yet in that period mushrooms were contaminated to the extent of as much as 11,900 Becquerels (compared with the norm of 600 becquerels per adult human).

But the greatest complaints addressed by ecologists toward the government commission concern the so-called "hot points." A month after the explosion in Chernobyl Poland was visited by a group of Japanese nuclear power experts. It was they who were unofficially told about the mysterious "hot points" and passed on the news worldwide. The commission's members later tried to deny the existence of these points, but it was too late. The "hot points" turned out to be the residues of the graphite moderator, which was destroyed during the explosion. It was only on 24 March 1987, during a meeting of members of the Polish Ecological Club on the consequences of the Chernobyl disaster, that photographs of these hot points were shown. Calculations showed that, e.g., in Masuria, on the average there was

one point with radiation on the level of 100 Bq for every 10 square meters, and one point with radiation on the level of 300 Bq for every 30 square meters. In Krakow 16 sites of occurrence of the "hot points" were identified. According to the periodical NATURA (No 321), a particle with such radioactivity would, if it enters the lung, burn a hole several millimeters large.

The Present

It can be said without exaggerating that at present every inhabitant of the Northern Hemisphere contains in his organism some radionuclides deriving from Chernobyl, according to Professor Z. Jaworowski.

The radiation doses received by the population of the USSR, Europe, Asia, and North America during the first year following the accident, and which it will receive altogether during the next 50 years were computed by several independent research teams. A report prepared toward the end of 1987 by a team of several dozen scientists directed by Professor M. Goldman has divided the affected populations into four groups. It included Poland's population in the third group, which comprises the entire area of Europe with the exception of the USSR. These studies indicate that during the first year after the accident each Pole received on the average an additional 15 percent of the yearly natural dose. During the next 50 years he will in addition receive altogether one percent of the natural dose.

Scientists from the International Advisory Group on Nuclear Security estimated in 1986 that, out of the population evacuated from the Chernobyl region, 170 persons may die of cancer in the next 70 years. In Europe, and hence also in Poland, this number will reach 0.02 percent of the normal death rate due to cancer.

More specific data were provided by Dr Jerzy Jaskowski of the Physics and Biophysics Laboratory of the Medical Academy in Gdansk. He reported that, according to various criteria, the number of deaths caused by the Chernobyl disaster during the next 25-30 years may be estimated at 4 for every 200,000 in Poland. It is already known that in Krakow Voivodship the number of leukemia cases has increased 100 percent, and in Wroclaw Voivodship, 40 percent. This matches the map of this country's contamination (see PRZYRODA POLSKA, April 1988).

It is assumed that the consequences of Chernobyl to children will be considerable. Colonel Professor W. Baltrukiewicz reports that they received 2,000 times the permissible norm of the radiation dose in their thyroid gland. As a result, according to the death risk factor computed by the UNSCEAR, out of the 10 million children in Poland, about 10,000 children additionally will die of thyroid cancer, assuming proper treatment of the disease in every case. However, J. Jaskowski claims that in Poland barely one out of every 10 patients receives proper treatment. Hence, the number of deaths may increase.

Medical practitioners who treat patients daily generally believe that many instances of illness which they have encountered in the last few months were caused by radioactive contamination. Not one of those polled has, however, been willing to unequivocally affirm this surmise.

One such practitioner declared on the telephone, "Fear of eventual consequences is not the point. Most of my colleagues are simply not yet quite certain whether some of the current ailments should be linked to the Chernobyl disaster. For the time being other causative factors or circumstances cannot be eliminated. Perhaps in 10 years we shall know for certain."

Initial press reports on the Chernobyl disaster and subsequent analyses most often refer to the toxicity of iodine-131. But other, no less toxic elements with a longer half-life fell on Polish territory. The half-life of cesium is 28 years and that of strontium, 64 years. Both these elements penetrated the soil, among other things. They are moving downward in the soil at the rate of 5 to 8 cm a year. However, every spring and fall plowing causes them to rise to the surface. To resolve this problem, many hectares of land would have to lie fallow for at least several years. Strontium, on entering the organism, deposits chiefly in the skeleton. That is why, ever since the disaster, many physicians advise against cooking soup from bones, especially for children.

The experience gained during other, previous nuclear accidents teaches that the maximum contamination of food by radioactive elements occurs during the first 18 to 24 months after the accident. This means that in Poland food was contaminated most during 1988. That too was not officially reported.

In addition to the biological consequences of the disaster, psychological consequences are no less important. This may be exemplified by the reaction to the rumor, "circulated" in Warsaw last November, that there was an accident to a nuclear power plant in Czechoslovakia, resulting in the influx of contaminated air to Poland. The principals of certain schools and preschools forbade pupils to leave the buildings. Stores of food and water were accumulated in the wait for the radioactive wave to flow past the Capital. Official denials in the mass media did not help. The public mood calmed only after no Western radio station confirmed this report. Compared with the rest of Europe and the world, the "nuclear" psychosis has not yet reached a peak in Poland. Missing, for example, are statistics on stillbirths and deliberate abortions. But in Greece it was found that, in connection with fears of the consequences of Chernobyl, the birth rate was 2,500 lower. For Western Europe as a whole the decline in birth rate reached 200,000 (according to THE JOURNAL OF NUCLEAR MEDICINE, 1987).

In the opinion of experts, "atomic neurosis" in this country will reach its peak only after two new points appear on the industrial map of Poland: the nuclear power plants in Zarnowiec and, later, in Klempicz.

The Future

"The casualties that happened should mobilize people to elevate the level of their technical culture, they should be a school of rather than a brake to development," said V. Shikalov, a staff member of the I. V. Kurchatov Atomic Energy Institute in the USSR.

J. Jaskowski is of a completely different opinion: "Poland is technically and technologically not prepared for the development of nuclear power industry of her own. Technical culture is at such a low level that the building of a nuclear power plant means a step toward collective suicide."

J. Jaskowski supports this claim with arguments: This country lacks a suitable cement (it is feared that the so-called Special Cement 35/90 of Malogoszcz is unsuitable for processing into a concrete of the required homogeneity); a suitable steel is lacking, too; the work done so far on the Zarnowiec Power Plant leaves plenty to be desired, according to the supervising commission, and yet this concerns for the time being only the least complicated operations; R. Sobolev of the Kurchatov Institute claims that there can be only one conclusion from the Chernobyl disaster—the nuclear power industry should develop in conditions maximally assuring human safety and environmental safety, yet the very selection of the WWER-type [water-moderated water-cooled] reactor for the first Polish nuclear power plant is causing considerable doubts among ecologists, for it is one of the most common water-cooled reactors but, skeptics say, if water happens to be lost owing to, say, the cracking of the feeder pipe, only a thick concrete reactor

shielding could prevent a disaster. Yet, as known, to economize on spending, no provision has been made for such a shielding at Zarnowiec. Besides, according to FORTUNE (1 August 1988), in the event of a major breakdown the safe period in a water-cooled reactor is 20 minutes and in its improved version, 3 days.

To ecologists the alternative is clear: either a nuclear power industry or a safe existence. The supporters of nuclear power plants in Poland offer a different choice: either [building the nuclear power plants in] Zarnowiec and Klempicz or, in 15 years or so, darkness will descend over this country and there will be an economic impasse owing to an energy shortage.

But James Moote, a vice president of Westinghouse, the largest producer of nuclear reactors in the United States, perhaps best defines "atomic neurosis": "We gain little by explaining to people that the possibility of a radioactive contamination of the atmosphere by our reactors is one in 10,000,000, if we are aware that such contamination may occur as soon as tomorrow. After all, we are selling our products to worried consumers, not to statistical experts."

ROMANIA

Ceausescu Visits Cernavoda Power Plant Site *AU0903200589 Bucharest AGERPRES in English 1908 GMT 9 Mar 89*

[Article: "President Nicolae Ceausescu's Visit to the Cernavoda Nuclear Power Plant Construction Site"]

[Text] On March 9, the general secretary of the RCP and president of Romania, Nicolae Ceausescu, paid a working visit to the nuclear power plant construction site at Cernavoda, a priority power-engineering project of particular significance for the country's economic and social progress.

The visit was an opportunity to make an in-depth, on-the-spot analysis of the stage of construction works, as well as of the way in which the specific programme for the smooth run of all activities contributing to the on-time completion of that high-quality investment project is being implemented.

Participating in the visit were Constantin Dascalescu, Ion Dinca, Ion Radu and Silviu Curticeanu.

President Nicolae Ceausescu visited the first of the five generator sets of the nuclear power plant (each boasting 700 MW), where he was informed of the course of construction-assembly operations as concerns both the nuclear and conventional aspects, as well as several high-tech units—the reactor, the main control room and, in the machine hall, the turbine and the generator, now under assembly works that have entered an advanced stage. The Romanian head of state was also informed of

the stage of operations in the reactor building, as well as on the second generator set of station, where the major equipment was partially mounted.

In consideration of the results scored so far and, more particularly, of the requirements for building that plant, President Nicolae Ceausescu requested that action should be taken with utmost responsibility to better organize work on the construction site, to perform high-quality operations, in line with existing international norms in that area, at a working pace according with the special programme that was worked out for that investment project.

The RCP general secretary insisted on the need to secure the delivery and assembly of equipment according to the schedules and terms that were set under endorsed programmes. Furthermore, he called attention to the special responsibility incumbent on the manufacturers of equipment, outfit and installations so that they may all boast high quality and great reliability.

Throughout his visit, President Nicolae Ceausescu talked to workers and technical staff in connection with existing conditions for the completion of assembly operations and the preparation of the commissioning of the first unit.

After seeing round the construction site, President Nicolae Ceausescu met managerial staff in ministries, industrial central departments, enterprises and research and design institutes, as well as other decision makers responsible for the construction and exploitation of the nuclear power plant at Cernavoda.

Taking the floor, Nicolae Ceausescu underscored the special importance of the completion of works and the commissioning of the nuclear power plant at Cernavoda. Referring to the special programme for the completion of construction operations and the commissioning of the first generator set and, then, of the other units making up the plant, the speaker requested all responsible staff to work with a sense of utmost responsibility for its application to the letter.

The RCP general secretary highlighted the special importance that should be attached to the strict observance of quality norms, the performance of control operations on the basis of last-minute methods and recommended that the entire expert and technical staff of the national physics centre should be directly involved in that activity.

Furthermore, he insisted on the need for workers and foremen to be directly involved and take part with a sense of high responsibility in quality-control operations on parts and operations.

In consideration of the particular significance of the Cernavoda nuclear power plant for the national economy, President Nicolae Ceausescu set a number of

precise tasks for government members as concerns the follow-up of works and the effective support to be granted to the fulfillment of the measures that were agreed upon.

At the end of the visit, addressing the thousands of construction and assembly workers on the platform nearby the first generator set, the RCP general secretary showed that he had wanted to once again visit the nuclear power plant construction site at Cernavoda to discuss problems

related to the completion and commissioning of the first generator set and then of the other sets. Stressing that measures had been agreed upon that call for a greater concentration of efforts, for a rise in the sense or exigency, for a better organization of work for the completion of operations in the shortest possible time and for the generation of electric power, the speaker expressed his belief that the working people would fully and most responsibly commit themselves to the fulfillment of the major tasks that have been entrusted to them.

CHILE

Cooperation Agreement To Be Signed With PRC
*PY0903010589 Santiago Radio Chilena Network
in Spanish 1600 GMT 8 Mar 89*

[Relay from La Moneda palace by Pia Diaz]

[Text] Chile and the PRC will sign a cooperation agreement on the peaceful use of nuclear energy.

This announcement was made by the president of the China National Nuclear Corporation, Minister Jiang Xinxiang, after meeting Foreign Minister Hernan Felipe Errazuriz.

[Begin Jiang Xinxiang recording in Chinese followed by Spanish translation] First, we will conduct a scientific and technological exchange between the two countries. [Jiang Xinxiang speaks in Chinese again, but without following Spanish translation] [end recording]

Later, Victor Aguilera, executive director of the Chilean Energy Commission, said that the PRC is one of the world's five most advanced powers in the nuclear energy field.

[Begin Aguilera recording] As I just told you, the PRC has 300,000 professionals in this field.

We are basically interested in uranium prospecting. They have rock formations similar to ours. They can, therefore, send us professional geologists to help us prospect for uranium here in Chile.

Another field for cooperation is 'in situ' uranium leaching. [end recording]

Aguilera said that the cooperation agreement will be signed on 17 March.

The PRC delegation will return to their country on 19 March, after visiting various nuclear research centers and some regions of the country.

INTERNATIONAL

First Conference of Arab Nuclear Authority Described

51004501 Kuwait AL-WATAN in Arabic 1 Dec 88 p 16

[Interview in Tunis with Dr 'Abd-al-Hasan Zalzalah by Rashid Khashanah: "Creation of Arab Nuclear Energy Authority a Quarter Century Late"; date not given]

[Text] Dr 'Abd-al-Hasan Zalzalah, the Arab League assistant secretary general for economic affairs, confirmed that the Arab countries have begun to take a serious interest in nuclear energy development following the creation of the Arab Nuclear Energy Authority [ANEA] which held its first conference last week.

In a special interview with AL-WATAN in Tunis, the Arab expert added that the Arabs have 70 universities, 500 scientific research centers, and 500,000 researchers and scientists calling for the utilization of these huge capabilities for the advancement of the Arab nation. He called for real transportation and communications linkage between the various parts of the Arab nation from east to west so that land, sea, and air networks may become integrated, turning into arteries in one Arab body to pave the way for economic integration. Following is the text of the interview:

[AL-WATAN] The recent conference held by the ANEA in Tunis adopted an important resolution in announcing the authority's birth and designating its headquarters. What are the functions of this new pan-Arab establishment and what role will it play in advancing the search for alternate sources of energy in the Arab nation?

[Zalzalah] The ANEA held its first conference at the ministerial level. The conference was attended by 11 Arab countries in addition to two other countries as observers. The political decision pertaining to Arab cooperation in the field of nuclear energy dates back to 1964, or to the Arab summit conference in Cairo which reaffirmed the importance of utilizing the atom and Arab cooperation in this field for peaceful purposes. A cooperation agreement was drawn up and ratified by eight Arab countries in 1965 and it has been in effect since 1970. The so-called Scientific Council for the Peaceful Use of Atomic Energy held its only meeting in 1970 whereupon the Arab countries focused their efforts in the seventies on building regional establishments to act as a tool and a launching pad for cooperation. In the 1974 Rabat summit, another political decision was issued at the highest level calling for focusing Arab cooperation on the field of science and technology. The ministers called upon science and technology officials to get together to create science and research councils. The tendency then was to establish a fund with a capital of no less than \$500 million to develop joint cooperation among Arab countries. We had to wait until the beginning of the eighties to see a renewed interest in Arab cooperation in the field of energy. But 16 years had

passed since the 1964 conference and it was necessary to reexamine the agreement itself, which we did. The latest conference was the first following this amendment and it was aimed at intensifying cooperation among Arab countries for utilizing atomic energy in medicine, agriculture, industry, protection against atomic radiation, and electric power generation, taking into consideration the experiences of some advanced countries such as the Chernobyl incident.

[AL-WATAN] Are the prerequisites for Arab cooperation in this field available in the required form and magnitude?

[Zalzalah] The Arab countries have many of the prerequisites for this kind of cooperation. What we lack, however, is how to put the right person in the right place and how to make use of our capabilities.

We now have 70 Arab universities, about 500 scientific research centers, about 500,000 scientists and researchers at scientific centers and hundreds of thousands of science graduates. My perception is that this human power is qualified to make use of its capabilities to create and make innovations in this field. This is not to mention that we have available funds and all we need, therefore, is for the Arab countries to refrain from working alone or from dealing individually with the outside world that imposes its projects on them.

There is no doubt that serious Arab solidarity in this field will be a key factor in obtaining the most favorable terms, beginning with the generation, assimilation, and integrated utilization of suitable technology and ending with the coordination of regional plans in this field. Arab experiences in the sixties and seventies bear witness to the existence of a big problem, namely the gap created by the split relations within the one region between the educational institutions, or universities, on the one side, the research centers on the other side and also the production sectors, the principal beneficiaries of research.

[AL-WATAN] Why the rush to create an authority at the present time? Were there compelling circumstantial factors that led to that?

[Zalzalah] There were two key factors that increased Arab interest in this field and in the authority in particular. The first is Arab conviction that the age of gas and oil energy will not last long and the Arab countries have no other conventional sources of energy to speak of. The second is that the use of nuclear energy for electric power generation has become a key option for the future. Add to that the fact that the world is approaching the third scientific and technological revolution, a revolution built on multiple specializations, on information science, on education and on technology. Therefore, unless we establish scientific research centers, we will not be able to narrow the scientific gap between us and the West. This can only be done on a pan-Arab level because, given the

nature of these activities and the capabilities they require, no Arab country can establish a true research and scientific testing center all by itself. It may be said that the ANEA laid out the basic rules when it appointed a director and chose a permanent headquarters.

[AL-WATAN] The recent Arab ministers of transportation conference adopted distinct resolutions aimed at tearing down the barriers that existed between the different parts of one nation. Did the climate of Arab conciliation unleash this trend toward Arab economic integration?

[Zalzalah] We now have a clear perception of Arab cooperation in the field of transportation. Even at the last meeting, Arab endeavors in this field remained scattered and splintered on a bilateral basis. As for the general Arab level, this sector was one of the few that suffered the absence of a universal perception for two reasons: first, every Arab sector had then and now more than one institution responsible for the sector and these institutions are not brought together by any one side. Second, on the pan-Arab alevel, we notice the same phenomenon as well. We have several sectors and various institutions, but there is no umbrella under which they can come together. Therefore, the first thing we did was to create an Arab ministers of transportation and communications council. We then drew up a long-term, a medium-term, and a short-term strategy, focusing on the role of this sector as the one that can achieve true linkage between Arab countries that gives substance to the talk about integration. Transportation networks are like arteries in the human body and these arteries must be open and accessible. What is the use of having airlines and railroads when all kinds of obstacles and procedures prevent the citizens from moving from one Arab country to another? And how can one move when transportation costs are so high? Therefore, attention zeroed in on land, sea, and air transportation sectors, in addition to the communications sector that ties people and institutions together. We have accomplished significant progress such as the Arab satellite, ARABSAT, which is the true link between the Arab economies. There are other procedures that must be adopted on the pan-Arab level, something we hope will take place at the next meeting by reaching an agreement on joint transportation projects to facilitate the movement of goods and to simplify and regulate the steady movement of people. We shall also search for a way to close the gaps between the Arab states in the field of transportation. There are railroad systems, well known in all the Arab East as well as the Arab West, that reach several areas but are cut off at central points. What we need to do is to avoid political differences and guarantee freedom of movement.

There are other joint projects such as ship classification, reduced tariffs and cooperation among Arab companies in their relations with the outside world, projects which I hope will be discussed and adopted in the next meeting.

[AL-WATAN] Arab pressures have compelled Europe to agree to deal directly with West Bank and Gaza Strip products without going through the Israeli entity. Is this international pressure expected to continue to lend economic support to the uprising?

[Zalzalah] The Arab countries had several objectives in mind when they sought to achieve the influx of West Bank and Gaza products into Europe. The political implication is clear: to reject the organic tie Israel—just like any other colonialist—has forced on the West Bank and the Gaza Strip, whereby it dictates production, pricing, and marketing policies with a view to imposing total hegemony over the Palestinian economy. Opening windows for this economy to get its products directly to the outside is certainly a kind of disengagement and a way to reduce dependency. Second, this step is an endeavor to make our European friends aware of the kind of policies the Israelis are following to keep the Palestinian entity totally dependent on Israeli options with regard to agricultural imports and exports as well. Third, it is an effort to foster the Palestinian people's steadfastness in the occupied territories. For holding on to the land is contingent upon the ability to get production to foreign markets and the obstacles Israel used to impose led to the stockpiling and destruction of production. Fourth, the European market accords Arab products preferential treatment. These are the political and economic highlights of the European stance. We are seeking to provide economic support for the uprising because, without a renewed source of subsistence and reliance on its self-capabilities, it cannot handle repression and, consequently, steadfastness.

In this context, I would like to point out that the European Common Market announced its refusal to ratify some economic agreements with Israel if the latter fails to allow Arab products to leave the occupied territories. Unfortunately, however, Claude Chesson, the EEC commissioner general, in his recent statements backed down on this position. The Arab countries, however, promptly brought this problem under control and so far indications are that the EEC is keeping its promise to give Palestinian producers in the occupied territories a full opportunity to promote their products in European markets. We have a feeling that it is not so much a matter of pressure as it is of persuasion. Repressive practices in the occupied territories—and the Western media is fully aware of them and of various human rights violations—help us to stay in contact with EEC countries at the various levels. I think that these countries are becoming more convinced about supporting the Palestinian people's right and just struggle. My idea is that the continued, direct influx of Palestinian products into Europe is an important source of support for the uprising which must be preserved.

Pact Between India, Asian Nations Urged
52500023 Bombay *THE TIMES OF INDIA* in English
6 Jan 89 p 12

[Article by K. Subrahmanyam]

[Text] The claim made by Ms Benazir Bhutto at a meeting of editors in Lahore on December 26 that if her late father, Zulfikar Ali Bhutto, has not been deposed in

July 1977, Pakistan would have become a nuclear power by December 1977, has caused considerable confusion, especially in that gullible section of opinion which took her statement in her first press conference on assuming the office of prime minister (that she would have nothing to do with any kind of nuclear weapon programme) at its face value. Some of the gullible assembled in the second international scientists' congress on "ways out of the arms race" in London on December 2-4, 1988 even proposed sending a message of congratulations to her and another message to the Indian Prime Minister (at the suggestion of a Pakistani participant) to reciprocate this gesture, against by strong advice that it would harm Ms Bhutto.

Simple Explanation

In fact the explanation for the apparent contradiction in Benazir's stand is quite simple. At her first press conference Ms Bhutto was trying to reassure the Americans. They played a significant role in persuading Mr Ghulam Ishaq Khan and the generals to swear in Ms Bhutto as the prime minister. The U.S. administration could thus claim credit before Congress for ushering in democracy in Pakistan, continue their arms supplies to Afghan tribal insurgents, keep Pakistan on their side for any future Gulf contingencies and also sweep the nuclear issue under the carpet to ward off the criticism of some sections of Congressmen.

On assuming office Ms Bhutto should have found out that Pakistan already had the bomb and that the generals would not give it up. The generals were also quite confident that the U.S. administration's pressure would not proceed beyond certain verbal limits for it needed them more than the other way around. In the light of this and the popularity of nuclear weapon capability among the people of Pakistan and the justifiable pride of the Pakistani nuclear establishment in its achievement, the Pakistan prime minister has decided to attribute the credit for Pakistani nuclear capability to its real founder, the late Zulfikar Ali Bhutto. Her charge that if her father had not been overthrown Pakistan would have reached the weapon capability earlier is not a frivolous statement but a well-founded one.

Mr Bhutto took the decision to go for nuclear weapons at a meeting held in Multan on January 24, 1972. In his book *Aur line cut gaye*—Maulana Kausar Niazi has given details of the late prime minister's efforts to raise funds from the Arabs. Dr Usmani, then chairman of the Pakistani Atomic Energy Commission, has disclosed how Mr Bhutto sacked him because of his lack of enthusiasm for the bomb project. Mr Khalid Hassan, Mr Bhutto's then press secretary, revealed in a BBC programme as far back as 1980 how Libya first funded the bomb project. Mr Kausar Niazi has named Mr Agha Shahi and Mr Ghulam Ishaq Khan among the special envoys Mr Bhutto sent out to raise funds from Saudi Arabia, Iraq and the Arab Emirates.

In his death cell testimony Mr Bhutto himself had highlighted that Pakistan was about to reach full nuclear capability when he was toppled. The full nuclear capability is referred to by him in the context of his rhetorical question that while Christians, Communists, Jews and the Hindus had nuclear capability why not Islam, thereby clarifying that he had in mind weapon capability.

In the same death cell testimony Mr Bhutto also said that he would be remembered by future generations in Pakistan, not for his achievements, such as the constitution of 1973, getting back the territory and prisoners of war through the Simla pact at very little cost to Pakistan, restoring Pakistan's spirit after the defeat in war and his achievements as prime minister but for a treaty he concluded in June 1976 with a foreign country after 11 years of patient negotiation, a treaty which would have a far-reaching impact on Pakistan's future. Mr P.K.S. Namboodiri of the Institute for Defence Studies and Analyses was the first researcher to correctly deduce that this should be a reference to a pact with China for transfer of nuclear weapon technology to Pakistan.

Pact Concluded

In the winter of 1980 Mr Edgar O'Ballance a noted analyst with close connections with the British intelligence community, wrote in National Defence that Pakistan and China did conclude a pact for transfer of nuclear weapon technology during Mr Bhutto's visit to China in June 1976 which would have enabled Pakistan to conduct a nuclear test by December 1977. After his overthrow in July 1977, the Chinese withheld the transfer of technology and resume it only after the Soviet intervention in Afghanistan in 1980. The western intelligence community has repeatedly asserted that the Chinese furnished to Pakistan with the design of their fourth bomb (a compact one carried on a missile warhead).

In a seminar in Beijing which I attended in October 1988 when the issue of Chinese supply of CSS-2 ballistic missile to Saudi Arabia was raised and the Chinese commitment to nonproliferation was questioned, a Chinese participant belonging to their foreign office said that China was a responsible power and but for China's restraint Pakistan would have become nuclear in 1978 itself, thereby confirming the hypothesis of a secret treaty concluded by Mr Bhutto during his visit in June 1976. Therefore, when Mr Benazir Bhutto says that General Zia-Ul-Haq's coup thwarted Pakistan having nuclear capability by the end of 1977 she is only confirming the above assessment of the chain of developments in regard to Pakistani nuclear weapon capability.

This indirect confirmation of the Chinese involvement in Pakistan's nuclear weapons programme makes it imperative that China should be involved in any nuclear arms control in this part of Asia. The matter cannot be treated as a bilateral issue between India and Pakistan, which was implicit in General Shahabzada Yakub

Khan's plea for a nuclear weapon free south Asia. Pakistan's ambassador to India, Niaz Naik, described General Zia-Ul-Haq policies as deceitful (Hindu, December 10, 1988). The prime minister, Benazir Bhutto has correctly withdrawn the fake proposal of General Zia for a no-war pact.

The generals who seized power by overthrowing an elected regime of their own country were disloyal and deceitful and could not be trusted in respect of any worthwhile treaty. That is why many patriotic Pakistanis had urged India not to do any deal with General Zia—a point which was totally missed by some people in this country. They were easily taken in by the wiles of the cunning general who had betrayed and then assassinated the very prime minister who trusted and advanced him in his career. Ms Bhutto should appreciate that the words of the erstwhile collaborators of General Zia who are still very much in power and are around her are not likely to carry any credibility in this country. The latest constitution of the defence committee of the cabinet in Pakistan with three service chiefs, chief of interservices intelligence, an ex-general and another close associate of General Zia would show that limited freedom of decision the new prime minister is likely to enjoy.

Practical Course

She should now be persuaded that the only practical course will be for India and Pakistan to follow up the agreement on nonattack on nuclear installations by an agreement not to use their respective nuclear capabilities against each other and to bring in China and the USSR into a joint agreement not to use their nuclear capabilities against south Asian nations as suggested in the declaration issued by the international conference held in Delhi during November 14-16, 1988 on "towards a nuclear weapon free world." Such a move will be a step contributing to President Gorbachev's vision and to Mr Gandhi's disarmament plan proposed in the third UN special session on disarmament.

In *The Times of India* (July 30, 1985) this writer had suggested a 3-point plan to achieve specific objectives. The first point was an agreement between India and Pakistan not to attack each other's nuclear installations. The last point is the one featuring as point ten in the Rajiv-Gorbachev declaration calling for a ban on the use and threat of use of nuclear weapons. The second point is the one referred to above—an agreement between India and Pakistan not to use their nuclear capabilities against each other and in south Asia and to call on the USSR and China to join the agreement. India took the initiative in regard to points one and three and it is time for India to take the initiative on point two as well.

Egypt, Morocco Sign Energy Protocol 45000121z Cairo AL-AKHBAR in Arabic 1 Feb 89 p 6

[Article by Muhammad al-Shamma']

[Text] Today a technical cooperation protocol was signed between Egypt and Morocco in the fields of traditional and nuclear energy and the mining industries.

The protocol was signed on the Egyptian side by Minister of Electricity and Energy Mahir Abazah and on the Moroccan side by Minister of Energy and Mining Mohamed Fatah.

Over the last 2 days, the two sides have reviewed the possibility of technical cooperation in the area of domestic industries for generators, electrical transformers, new and renewable energy, plans for electricity grids, and exploiting domestic expertise and capabilities in joint manufacturing between the two countries.

Minister of Electricity Mahir Abazah said that the Egyptian-Moroccan joint delegation is charged with setting up cooperative projects and that these projects will be submitted to the two countries' supreme committee.

AL-AKHBAR has learned that the Moroccan side has requested Egypt's participation in hands-on training for the technical aspect of the nuclear project and in exporting sulfur necessary to Morocco's phosphate production. Morocco's need for raw sulfur is estimated at three tons annually.

During the talks, the Moroccan minister also reviewed energy programs in Morocco and extending the capabilities of Egyptian participation in implementing some of its projects in designing or building power stations, and in implementing the scheduled Moroccan nuclear program until the year 2000.

The Moroccan minister said that his visit to Egypt came within the framework of directions from His Majesty King Hassan II to cooperate in various areas, as Egypt has tremendous technical and industrial capabilities, and to maintain the potential for completing projects between the two countries benefitting both Egypt and Morocco. He said that Morocco produces approximately 1,200 tons of uranium annually, which it extracts from phosphoric acid derived from phosphate. He said Morocco is able to offer its technical expertise in the area of uranium manufacturing, whose establishment in Egypt is imminent.

Egypt Reportedly Researches Weapons With Argentina, Iraq 51004604 Tel Aviv DAVAR in Hebrew 5 Feb 89 p 10

[Article by Dani'el Leshem, member of the research team of the Military Balance Project of the Tel Aviv University Center for Strategic Studies: "Egypt On Its Way To Developing Military Nuclear Capability"]

[Text] Egypt, Iraq, and Argentina have been cooperating since 1984 on a project designed to develop a ground-to-ground missile with a radius of about 800 km, known in Egypt as Badr-2000 (a modification of the Argentine Condor 2 missile). Also involved in the project are large West European companies which supply technological expertise and various systems, especially in the area of rocket propulsion and landing. To do so, they have to

circumvent the restrictions existing in their countries on the manufacture of defense equipment. Those companies, particularly the West German MBB, have apparently also sent experts to work in missile development and manufacture plants in Egypt and Iraq.

The Badr-2000 project came into the limelight a few months ago on the occasion of a failed Egyptian attempt to smuggle state-of-the-art material from the United States—light-weight carbon-carbon fibers that reduce the radar imprint of the missile and are resistant to very high temperatures—needed to continue the development of the missile.

The present fate of the Badr-2000 project is not known at the moment, but there have been rumors of technical difficulties, financial difficulties, and U.S. pressure on West European countries about the circumvention of export restrictions, which apparently are delaying the development of the new missile. Nevertheless, this cooperation has advanced Egyptian and Iraqi missile production. Those two countries have succeeded, probably jointly, in improving on Soviet Skud ground-to-ground missiles and increasing their radius to a relatively long range of 650 and 900 km.

The Iraqis even continue publishing ongoing stories about their successes in the area of developing rockets and missiles, such as the completion of the development of a 262-mm artillery rocket nicknamed Ababil, with an approximately 50-km range warhead, and several projects to develop ground-to-ground rockets and missiles with ranges of over 100 and 200 km. The Iraqis also recently reported the successful testing of an antimissile missile, although at this stage there is no way of telling what sort of missile it is, what its technical specifications and performance are, and certainly not the origin of the know-how on the basis of which it was developed or manufactured.

Egypt and Argentina have recently been developing cooperation in another area of great strategic importance, namely in the nuclear area. On 17 July 1988 Dr Rashdi, the head of Egypt's Nuclear Power Authority [NPA], gave an interview to the Kuwaiti paper AL-'ANBA in which he reported that Argentina suggested to Egypt the building 22-megawatt nuclear power plants, most of them (95) in Egypt.

In the same interview Dr Rashdi talked about plans to build a nuclear power plant; that project has existed on paper for many years now, and interested factors in Egypt are pushing to implement it. It was also revealed that a study done by the Egyptian NPA has shown that Egyptian civilian and military plants are capable, according to the authority, of manufacturing 80 percent of the power plant models existing in the West. What is meant is probably both research and power plants of various types.

The head of Egypt's NPA stressed the "Israeli nuclear threat," which "is a frightening fact," and added that Egypt must deal with this threat by means of an advanced nuclear industry. "The Arabs have scientists, money, and research centers," Rashdi said, "but they lack agreements and cooperation."

It appears that the anticipated cooperation with Argentina is one of the possible solutions to closing that gap, in view of the fact that Argentina certainly fits the bill from all viewpoints: it has an impressive nuclear technical capability and a "flexible" export policy, and it subscribes only partially to international agreements on the nonproliferation of nuclear weapons. All that makes Argentina a good partner that can help Egypt develop its nuclear infrastructure and progress toward a nuclear military option.

Argentina has a well developed nuclear infrastructure designed for both civilian and military purposes. It features, among other things, nuclear power plants, nuclear research reactors (the largest among them, which was designed by Argentina itself, but which is no longer in operation, has a 40 megawatt capability), a nuclear fuel plant (plutonium separation plant), a uranium enrichment plant, and plants for the production of heavy water, for mining and processing uranium, and for producing nuclear rod elements.

Argentina is also in the process of developing a nuclear submarine. Another important factor is that Argentina allows international monitoring of only some of its installations and some of its nuclear activities, and subscribes only partially to international nonproliferation pledges. It is not a signatory of the main treaty on the nonproliferation of nuclear weapons.

Argentina exports nuclear installations, equipment, and fuel to many developing countries, apparently for the purpose of financing further nuclear projects of its own, such as expanding the uranium enrichment plant and developing the nuclear submarine that will allow it, among other things, to produce nuclear weapons in the not too distant future, should it decide to do so.

According to Leonard Spector's detailed and interesting book "The Undeclared Bomb," Argentina's "record" as an exporter in this area is very suspect. Examples abound; some are described in detail in the book and some are culled from newspaper sources:

- In May 1987 Argentina signed a contract with Iran under which Argentina undertook to convert a nuclear research reactor that the United States had built in Iran for use with 20 percent enriched uranium rather than 93 percent as its builders had intended. The contract was signed in violation of the U.S. international embargo on delivering nuclear equipment and materiel to Iran.
- In 1986 Argentina signed a contract to build a small research reactor in Algeria, and in 1987 it considered

delivering a small research reactor to Albania. The same year, it entered an agreement to provide assistance to Cuba in the area of nuclear power plants—all that despite the fact that the above three countries are not signatories of the international nonproliferation treaty. Argentina even has a tacit agreement on nuclear cooperation with Libya, which has been dreaming of securing nuclear weapons through any possible means.

- In May 1988, Argentina caused anxiety among the U.S. administration when it signed a cooperation agreement in the area of nuclear technology with Turkey and appointed the former chairman of the Argentine Nuclear Energy Authority as its ambassador to Ankara. The anxiety was due to the fact that in the past year Turkey made tireless efforts, secretly and illegally too, to obtain nuclear technology, especially from Pakistan, with a view to becoming self-reliant in the area of nuclear power and probably developing a nuclear military option too.

Thus, Argentina may assist Turkey's efforts to develop a nuclear capability, as did Pakistan in the past year. Moreover, there may be cooperation in the nuclear area not only between Argentina and Turkey and between Turkey and Pakistan, but also between the three together, in view of the fact that it was learned recently that Argentina's Atomic Energy Commission was assisting Pakistan also in this field.

A particularly interesting combined type of cooperation has recently been emerging between Argentina, Iran, and Pakistan. Arab newspapers have reported that Iran, which has recently been giving top priority to developing nuclear programs, sent some 30 scientists and engineers of its Atomic Energy Commission to research laboratories in Pakistan for advanced training, which includes the production of nuclear fuel (plutonium separation). The Iranians reportedly requested that their people study at the Pakistani institutions that enjoy the assistance of the Argentine Atomic Energy Commission.

A simultaneous report—which has not yet been confirmed—stated that Iran is building a uranium enrichment plant with Pakistani and Argentine assistance. In addition, it is already known that both Pakistan and Argentina—separately or together—are involved in plans to rebuild the Bushir power plants that were damaged in Iraqi air raids.

As for the anticipated cooperation between Egypt and Argentina, if the bilateral agreement is indeed signed, there is reason to fear that it will have significant growth potential. Among other expansion possibilities, in the future they may jointly build large, 40-megawatt atomic reactors (more suitable for developing nuclear weapons), power plants, a heavy water installation, and perhaps even an industrial size nuclear fuel plant. Not to be ruled out is also the possibility of Egyptian participation in the construction of the Argentine nuclear submarine.

Statements by Egyptian generals at the al-Nasir Military Academy and the Center for Strategic Studies of the Egyptian Army reflect Egypt's clear tendency toward developing a nuclear military capability. Egyptian scientists have also been known to express themselves in the same vein.

In an interview with AL-ITTIHAD of 10 July 1988, an Egyptian nuclear scientist said the gap between Israel and the Arabs in the area of nuclear energy is great but can be reduced if the necessary resources are invested in the field. The same Egyptian scientist reported, among other things, that Egypt's NPA is already engaged in studies of military nuclear applications within the Nuclear Fuel Laboratory Center, and added that "by separating fuels we can obtain the plutonium that is thought to be the fuel for the atomic bomb."

Thus, it is possible that Egypt already possesses a small-scale laboratory for separating plutonium. According to the above interview, Egypt is also striving to become self-reliant in the area of nuclear power production. Along this line, the NPA will import a small nuclear fuel installation; is searching for uranium deposits in Egypt; and is apparently considering mining, producing, and processing uranium up to the stage at which it can be used for nuclear fuel elements. The same tendency of seeking independence from foreign supply sources was recognizable in an item carried in December 1988 by the official Egyptian news agency about Egyptian plans to build nuclear power plants, some of which (50-70 percent) will be manufactured in Egypt. The item mentioned, among other things, a plan to produce heavy water in Egypt, and the beginning of the production of nuclear fuel rods in the course of 1989.

It is possible that the above statements are part and parcel of an Egyptian effort to convince additional Arab countries to participate in the nuclear projects that Egypt plans with the help of Argentina and/or other countries. Potential partners are Saudi Arabia, who has both the finances and considerable ambitions in military, as well as political areas, and Iraq, whose nuclear plans were dashed by the Israeli bombing of the Osirak reactor and who can gain from Egyptian-Argentine projects for its own purposes.

The Egyptians are emphasizing what they currently see as the Israeli nuclear threat to the security of Egypt and of the Arab world. It is indeed possible that their suspicions and apprehensions (and of other Arab countries) increased after the Vanunu disclosures and Israel's technological-military achievements in developing missiles, but it would seem that behind the above Egyptian statements stands primarily Egypt's wish to be the leading power in the Arab world, and that the Egyptians are using the claim of the Israeli nuclear threat for the purpose of increasing inter-Arab cooperation that Egypt can orchestrate and from which it can secure many economic, military, and political gains.

It is important to note that Argentina's nuclear cooperation with Egypt and with other Arab and Muslim countries is apt to expand considerably in the coming year if Carlos Menem, the Peronist candidate who also happens to be of Syrian origin, is elected president of Argentina. Note, too, in this connection that another activist of the Arab "lobby" in Argentina, Parliament member Bashir Ricardo Daud, was recently appointed ambassador to Cairo, while the outgoing Argentine ambassador to Egypt, Carlos (Barigi), returned home to run for the country's vice presidency. It does not take great imagination to conclude from these actual and anticipated appointments the depth of the present and future ties between Argentina and Egypt and other Arab countries.

EGYPT

Rebuilding of Iraqi Reactor Denied

NC2003080189 Cairo *MENA* in Arabic 0745 GMT
20 Mar 89

[Text] Eng Mahir Abazah, minister of electricity and energy, has denied a Gulf newspaper's report that Egypt and Iraq are currently studying plans for rebuilding the Iraqi nuclear reactor destroyed by Israel in 1981. In a statement today, Minister Abazah said that this subject has not yet been discussed.

The Bahraini newspaper AL-AYYAM, which published the report yesterday, said that this cooperation falls within the framework of a pan-Arab project being studied by nuclear energy experts in Egypt to build experimental nuclear reactors and nuclear power stations in accordance with a joint plan adopted by the Arab Cooperation Council countries.

Eng Abazah added that the construction of experimental nuclear reactors has not yet been discussed, indicating that no decision has been made yet, even on the Egyptian level, regarding the building of nuclear power stations for generating electricity.

INDIA

Concern Expressed Over Pakistani Missile Tests

BK0803103189 Delhi *THE HINDUSTAN TIMES* in English 28 Feb 89 p 13

[R.R. Subramanian article: "Pak Missiles: What They Mean"]

[Text] The Director of Pakistan's Space and Upper Atmosphere Research Commission (SUPARCO), Dr Salim Mehmud, had said in May 1980 that an indigenously built satellite named BADR would be launched. The carrier rocket that was to launch this satellite was never mentioned until news reports appeared in fits and starts in January this year to suggest that Pakistan had developed indigenously or was developing the Renuma and Shapar rockets.

General Mirza Aslam Beg, the Pakistani Army Chief of Staff, had announced while speaking to the officers of the National Defence College, Islamabad, that two missiles, one of range 80 km and the other with range of 300 km, had been successfully test-fired from the McVian coast of Baluchistan. These missiles have been appropriately named HATF-1 and HATF-2 after the deadly sword of the Holy Prophet. General Beg is believed to have witnessed the test-firings of the missile which has two stages.

Pakistan's SUPARCO, which is the equivalent of India's ISRO, [Indian Space Research Organization] had General Ziaul Haq as its chairman. After General Ziaul Haq's demise it remains unclear whether it is Ms Benazir Bhutto or General Aslam Beg who occupies that position. Pakistan's military is calling the shots on nuclear weapons. Not for nothing has it been that it is General Aslam Beg and not Ms Benazir Bhutto who also announced that a rocket carrying the payload weighing 150 kg had attained an altitude of 640 km and it had also been recovered on Pakistani territory. It is believed that this rocket was launched from the Sonmiani test range near Karachi as early as May 1988.

It was in May 1988, that U.S. Vice-President Daniel Quayle as Senator had published an up-date on ballistic missile proliferation in the Third World. It was in this update that he had pointed out to the U.S. Congress that a surface-to-surface rocket capable of carrying a payload of 500 kg was about to be launched. It has also been pointed out in this report that this missile may be similar to some Chinese missiles. One feels that it could be the M-11, which is yet to be exported.

India has little reason to be concerned about the HATF-2 before it is deployed in large enough numbers. Similarly, India's ISRO and DRDO [Defense Research and Development Organization] must move in tandem towards the development of ballistic missiles. The West German private company OTRAG which had set up a testing range in Zaire in 1978 and then moved to Brazil and then Libya is believed to have helped Pakistan develop rockets which have been christened Shapar and Renuma. According to Gen. Aslam Beg, one of the rockets that launched the payload weighing 150 kg and was recovered after it attained an altitude of 640 km, had an injection velocity of 9.6 kg per second, not enough to put a satellite into an orbit around the earth. This will in all probability be the next step, and for this reason, India too must keep in step by launching the AGNI, ASLV [Augmented Satellite Launch Vehicle] and PSLV [Polar Satellite Launch Vehicle] through successful test firings and then move into their conversion into ballistic missiles that can deliver payloads onto a target.

Pakistan's strategic relationship with China could well extend to the production of intermediate range ballistic missiles (IRBM's) as the next step. China has already transferred IRBM's to Saudi Arabia, the desert kingdom with which Benazir's predecessor had strong ties. There

can be no doubt that the metallurgist Dr A.Q. Khan and Dr Salim Mehmud are working towards a very definitive goal, namely of matching if not overtaking India in the missile era.

In short, then, India must not take Pakistan's posturing for peace at face value since the missile age has come to the sub-continent and for this reason adequate deterrence must prevail. Benazir in Beijing had expressed concern over India's nuclear submarine in the Indian Ocean. What about Chinese nuclear submarines?

Are they to be considered by Pakistan's military for procurement through lease initially? It is conceivable that the competition between the two countries—India and Pakistan—could reach the stage wherein each of them may eventually contemplate purchase in several numbers or attempt to develop them indigenously. Looking into the 1990s, this seems likely, as the competition between these two countries has already reached the stage where each country visualises that any move by one is detrimental to the other's security.

Pakistan's missile programme has graduated to the stage where a second test firing has occurred and Prime Minister Bhutto was shown watching it on television. What is significant is the "blow hot", "blow cold" strategy that she is adopting towards India, be it the Siachen Glacier, Kashmir or the nuclear issue. Dr Abdul Qadeer Khan, the brilliant metallurgist who heads Project 706 at Kahuta, is actively involved in the missile project.

Benazir's father Zulfiqar Ali Bhutto brought A.Q. Khan to Pakistan in 1975 and there is reason to believe therefore that Benazir will eventually reward him with the Chairman of the Pakistan Atomic Energy Commission (PAEC) presently headed by Mr Munir Ahmed Khan, for whom Qadeer Khan has made no secret of his dislike. What will be of significance for India's security in the 1990's would be the extent of Chinese collaboration with Pakistan on missile development. There have been reports in the Western Press that tend to suggest that Qadeer is to visit China very soon. This should come as no surprise largely because of Chinese interest in the gaseous centrifuge technique. There is, however, another aspect and that relates to ballistic missiles of longer range, say beyond 1,000 kms.

China is presently readying for export another missile in the M series—the M-9 which has a range of 600 kms. It is conceivable that A.Q. Khan may have already obtained an access to the designs of this missile. Mr Quayle in his update to the U.S. Congress in May 1988 had already made references to such a development. There is another development and that is in regard to the procurement of the CSS-2 intermediate range ballistic missile by Saudi Arabia, around the time the first test firing of the Pakistani rocket took place, namely, April 25, 1988. India does not face as yet a "missile gap" in the arena of ballistic missiles but the time is not far off when

such a gap may well become a reality. To avoid such a reality one must have several test firings, say as many as six of the "AGNI" and other in the SLV [Satellite Launch Vehicle] series. Even through demonstration deterrence must be made to prevail.

India's defence modernisation cannot slacken in the wake of Pakistan's thrust into the missile arena. One cannot remain content with the mere knowledge that the scientists of the ISRO and DRDO can develop missiles, one must deploy them for demonstrative deterrence of both Pakistan and China.

Cracks in Rotor Blade Force Madras Reactor Shutdown

51500070 Madras *THE HINDU* in English
23 Dec 88 p 9

[Text] Madras, Dec 22—The new rotor of the first unit of the Madras Atomic Power Station, Kalpakkam, has also developed cracks in its blades and the cracks were discovered when the unit was shut down for annual maintenance on December 6. This has forced the shutdown, which normally lasts for three to four weeks, to be extended for about eight weeks.

According to the Nuclear Power Corporation, Bombay, the period of shutdown of the first unit of the MAPS for annual maintenance was to be used for modifying the turbine train system received from the GEC/BHEL in October 1988. The high pressure turbine was opened for inspecting the rotor, which had been diverted from the Kakrapara Atomic Power Project, Gujarat, and installed in MAPS-1 in December 1987 because of a similar rotor blade failure on an earlier occasion.

"Surprisingly, it was noticed that the new rotor which had operated only for about 6,000 hours, also showed cracks in the blade in the fourth stage of the high-pressure turbine rotor. This unexpected failure has forced the Nuclear Power Corporation to get the original rotor repaired and install it in unit-1 as an interim measure. The repair work has just been taken up by the BHEL, Bhopal. It will involve the extension of outage period for about eight weeks and also reduction in power-level by 20 MW," the NPC said.

Third Failure

It pointed out that this was the third such failure of 235 MW turbine high-pressure rotors. While all improvements in the designs recommended by the BHEL/GEC had been incorporated in the subsequent stations, "the BHEL/GEC have again been advised to examine all issues and confirm the reliability of the turbines," the NPC said.

The second unit of the MAPS which had faced a leak in a calandria tube a couple of months ago is now back on line and is operating satisfactorily.

Narora Power Project Attains 'Criticality'
*BK1303085689 Delhi Domestic Service in English
0830 GMT 13 Mar 89*

[Text] The first unit of the Narora Atomic Power Project in Uttar Pradesh has attained criticality. The minister of state for science and technology, Mr K.R. Narayanan, told the Lok Sabha today that this marks another milestone in the country's plans to harness nuclear energy for economic development. In a statement, he said it also demonstrates the country's capability in tapping nuclear energy for peaceful purposes.

The 235-megawatt first unit uses natural uranium as fuel and heavy water as moderator and coolant. Experiments will now be conducted for 2 months at low power and generation of power will begin shortly afterward. Commercial operation at full power of the reactor is expected in 5 or 6 months. The power produced at the Narora plant will be shared by the member-states of the northern electricity region. The 532-crore-rupee Narora plant incorporates several improvements over the designs of the Rajasthan and Madras atomic power stations.

Further Details on Narora Nuclear Plant
*BK1403040689 Delhi Doordarshan Television Network
in English 1600 GMT 13 Mar 89*

[Text] The country has achieved yet another milestone in its plan to harness nuclear energy for economic development. The first unit of the Narora atomic power station [NAPS] has attained criticality. This was announced by the minister of state for science and technology, Mr K.R. Narayanan, in the Lok Sabha today amid cheers. He said that the nuclear power reactor, the country's seventh, went critical at 1040 [0510 GMT] yesterday morning. Hemant Kumar gives the details:

[Begin Kumar recording] Minutes before 11 o'clock on Sunday morning, scientists set off a nuclear chain reaction and sustained it in one of the two reactors. This is what is broadly meant by an atomic power reactor going critical. India's seventh operational reactor, NAPS-1, has a twin under construction alongside it. Together, they will generate 470 megawatts of electricity, 235 megawatts each. The fully indigenous NAPS-1 burns natural uranium. The fuel is mined, processed, and fabricated in India. Built at a cost of 532 crore rupees, NAPS has some improvements upon existing Indian reactors. The inner reactor wall is made of prestressed steel. It is enfolded by an outer wall of reinforced concrete. The two protective layers will keep any radioactivity from leaking, Dr Srinivasan [the Atomic Energy Commission Chairman] added. For the next 2 months, scientists will run low-power tests on the reactor. Dr Srinivasan said: A full 6 months later, power will be available on a commercial basis from the Narora's first reactor. The power produced will be shared by member states of the northern electricity region. Dr Srinivasan said NAPS-1 is absolutely safe. [end recording]

Safety has been given prime importance in the design of this power station. This power station also serves as a model for the subsequent reactors of 235 megawatts and the 500-megawatt reactors that are to follow thereafter.

New Units Added to Rajasthan Power Station
*BK0703160489 Delhi Domestic Service in English
1530 GMT 7 Mar 89*

[Text] Two more units of 235 mg capacity each are under construction at the Rajasthan Atomic Power Station. Four more units each with 500 mg capacity will also be set up at the same site. This information was given in the Rajya Sabha today in reply to a written question.

Promotion of Nuclear Power Plants Emphasized
*BK1503111589 Delhi General Overseas Service in
English 1010 GMT 15 Mar 89*

[Biman Basu commentary]

[Text] With the first unit of the Narora Atomic Power Station becoming critical on Sunday [12 March], India moved a step closer to the target of generating 10,000 megawatts of nuclear power by the end of the century. The unit, with the generation capacity of 235 megawatts, is the seventh nuclear power reactor in the country and the first of the standardized 235-megawatt pressurized heavy water reactor series to be designed and built in India. After a period of trial run, the first unit at Narora is expected to go into full power generation in a few months. When the Narora site was selected it was known that the plant was to be built on alluvial soil which is not as stable as solid bedrock. So necessary modifications in foundation designs were made, based on expertise available from various agencies.

According to the Department of Atomic Energy, the modified design can cater to all safety requirements envisaged during the life of the plant. The design of the Narora plant was evolved over the years when the international nuclear safety standards were continually undergoing revision. The plant design, therefore, meets all the requirements laid down in the revised safety standards. The plan design incorporates two independent fast-acting shutdown systems, three emergency core cooling systems, and double containment of the reactor building. The cooling water to all the heavy water heat exchangers is maintained in a closed loop so that failures in these do not lead to escape of radioactivity in the environment. One of the most important safety features of the Narora plant is the provision of a double containment system which surrounds the reactor core to prevent any accidental leakage of radioactivity. In fact, the Narora unit is the first pressurized heavy water reactor in the world that has been provided with a double containment. Waste management is another area where considerable thought has been given while planning the Narora plant. Its liquid waste management system has been so designed that no radioactive effluence, treated or otherwise, will ever be discharged into the Ganges.

The Narora unit is a part of a series of nuclear stations to be built over the next decade or so to bring up the total nuclear generation capacity to 10,000 megawatts by the turn of the century. As the minister of state for science and technology, Mr K.R. Narayanan, said in Parliament in New Delhi last Monday, India is virtually self-reliant in the field of nuclear power technology. In fact, India is today the only Third World country capable of not only designing, building, and running her own nuclear plants but also can extract, fabricate, and reprocess its own nuclear fuel. The nuclear fuel required for atomic power reactors is manufactured and supplied by Nuclear Fuel Complex, Hyderabad. The present operating capacity of the plant is about 80 tons of fuel per year for pressurized heavy water reactors. The production capability is being expanded to 225 tons by the year 1990-91 to meet the demand of the Narora plant. For meeting the requirement of fuel for future reactors separate facilities are under consideration.

Indian nuclear technologists have designed and built heavy water plants to supply heavy water for the nuclear power plants. Indian scientists have also developed a process for safe storage of radioactive wastes from nuclear plants. The technologies involved in the handling, processing, and treatment of radioactive waste are being constantly updated to keep pace with international developments. Nuclear power has been there for more than 40 years now. Today, there are more than 400 operating reactors in the world. France produces as much as 70 percent of its electricity from the energy of the atom. By contrast, the contribution of nuclear power in India is less than 3 percent. Even if the target of 10,000 megawatt by 2,000 A.D. is achieved, the contribution of nuclear power will go up to only 10 percent of the total. However, considering the fast depleting reserves of fossil fuels such as coal and oil, a large-scale environmental impact of hydel [hydroelectric] projects, nuclear energy offers a timely and safe alternative course of increasing energy availability in our part of the energy-starved world. The Narora plant is a step in that direction.

Nuclear Fuel Complex Planned in Tamil Nadu
*BK1603055189 Delhi Domestic Service in English
0435 GMT 16 Mar 89*

[Text] A nuclear fuel complex will be set up at (Palayakal) in Tamil Nadu. The complex, to be set up in a 1,240-acre area, will initially process 300 tons of fissionable material like plutonium and sponge [as heard]. According to an Atomic Energy [Commission] official, the processing will go up to 600 tons in the course of time. The complex will be on the pattern of the Hyderabad nuclear fuel complex.

IRAN

Diplomatic Sources Cite PRC Aid on Missile Plant
*OW0903112689 Tokyo KYODO in English
1050 GMT 9 Mar 89*

[Text] Cairo, March 8 (KYODO)—China is helping Iran build a plant to manufacture ground-to-ground missiles, a report from Bahrain said Wednesday. The report,

citing Western diplomatic sources, said the project was started in northeastern Iran after a U.N.-mediated armistice between Iran and Iraq took effect last August following an 8-year war. The missiles will have a range of 800 kilometers, the report said. It has been alleged in Western circles that China had exported Silkworm missiles and other weapons to Iran during the Iran-Iraq war.

PAKISTAN

Editorials Attack U.S. Nuclear Stance

Relationship 'Tenuous'

46000099z Karachi DAWN in English 3 Feb 89 p 7

[Article: "The Nuclear Bogey Again"]

[Text] The United States has been remarkable for showing a very selective concern about Pakistan's nuclear programme. Despite repeated assurances at the highest level that this programme was geared entirely to peaceful purposes, the US has not been able to cast aside all its misgivings. There is something discriminatory in this since it reserves for Pakistan the passionate concern the US has never shown towards the Israeli or Indian nuclear programmes. Pakistan could of course choose to disregard this application of double standards except that there is a close linkage between this issue and the smooth continuation of American aid to Pakistan. Under current Congressional arrangements governing this aid, the US President has to certify every year that Pakistan does not possess a nuclear device. If he does not, a suspension of American aid would automatically ensue. It is this aspect of the matter which has come to the fore with the leak in THE WASHINGTON POST that the Reagan Administration had told Congress that the US would be unlikely to give the requisite guarantees regarding Pakistan's nuclear programme during the current year. This report has caused understandable anxiety in Islamabad because it only adds to the pile of problems the new Government is having to contend with.

The Government has reiterated Pakistan's well-known position on this issue and the State Department in Washington, in a quick display of generosity, has welcomed this disclaimer hoping at the same time that Islamabad would "take concrete steps to demonstrate its commitment not to acquire" a nuclear device. Well and good for the time being, one might say, but the question remains as to what exactly Pakistan, short of surrendering a slice of its sovereignty, must do to assuage American concerns on the subject. It is a bit unsettling for this country to have to address this question every three months or so and to tackle the scepticism with which its protestations are met. Pakistan has offered to open its nuclear facilities to international inspection if India would do the same. It has suggested turning South Asia into a nuclear free zone only to have this proposal too shot down by India. This is besides Pakistan's sincere

protestations that it is not making a nuclear device, its programme being geared solely to the application of nuclear technology for peaceful purposes.

If Pakistan's detractors could present concrete proof of its misdemeanours in the nuclear field, then that of course would be a different matter making Pakistan liable to be impugned at the bar of world opinion. But with evidence that would settle the matter one way or the other hard to come by, various quarters try to make do with slur and innuendo. This is unfair and no way to treat a close ally. Pakistan and the United States have worked closely to undo the consequences of Soviet occupation of Afghanistan, Pakistan in the process having run a host of risks. It was always said by critics of Pakistan's Afghan policy that once the Afghan problem was settled, American interest in Pakistan would diminish. But it might have been supposed that even if that were to happen it would take some time before it became obvious, but THE WASHINGTON POST news report would suggest that the marks of weariness have begun to set in sooner than most people in this country would have expected. After the positive response of the State Department to the Government of Pakistan's statement, hopefully this particular episode has come to an end. But it has gone some way to show the tenuous nature of the present relationship between Pakistan and the United States and the ease with which, in certain circumstances, it could unravel.

U.S. 'Doublespeak' Noted

46000099z Islamabad *THE MUSLIM* in English
31 Jan 89 p 4

[Article: "Arm-Twisting, Again?"]

[Text] In a wonderfully timed leak, THE WASHINGTON POST has revealed that the Reagan Administration had informed Congress that the US may not certify that Pakistan's nuclear programme is peaceful, because it was close to acquiring capability to build a bomb. Once again, the nuclear issue has re-surfaced, triggering the usual kind of speculation about whether the US aid package to Pakistan can survive the issue. The timing of the newsleak, however, is interesting and suggestive. It can be construed as a not-so-subtle attempt at putting the new government in Pakistan on notice over the issue. Its underlying message can similarly be interpreted as yet another effort to wave the accusing finger at Islamabad in the hope of weakening its stand on the nuclear question. In plain language this amounts to arm-twisting—you assure us of your nuclear innocence and then you will be entitled to American goodies, in the form of the military and economic aid package.

Washington ought to understand by now that no country is willing—whatever the price—to abdicate its sovereign right over the nuclear option. Nor can a sovereign state, hand over a 'spare key,' as it were, to its nuclear installations, in order to assuage doubting Congressional members. The new American Administration should

also by now appreciate Pakistan's long-standing position on the issue. For non-proliferation to work, there has to be a regional approach. Countries like Pakistan cannot be selectively singled out to meet criterion set by Washington. The doublespeak long practised by the US on this issue has become proverbial. India, Israel, South Africa whose nuclear programmes are known to be far more advanced than Pakistan's somehow conveniently escape the American concern for non-proliferation. Strident noises are, it seems, only made about Pakistan's alleged nuclear ambition. This is clearly unacceptable. If the purpose behind the newsleak is to keep Pakistan on a short leash and pressure a government, struggling not just to establish itself but also a system of democracy in the country, then it is an unfortunate way to deal with an ally. This approach never worked in the past. It is not likely to do so now.

Editorial Urges U.S. To Revise Views

BK1103144589 Rawalpindi *HAIDER* in Urdu
26 Feb 89 p 3

[Editorial: "The Assurance of the United States"]

[Text] The meeting between the prime minister of Pakistan, Ms Benazir Bhutto, and the president of the United States, Mr George Bush, in the Japanese capital Tokyo on Friday has great significance because it was the first meeting of the elected leaders of these two countries. At the meeting both exchanged views on various regional and international issues, including the current situation in Afghanistan. After the meeting a spokesman of the Pakistan delegation said the American President assured the Pakistani prime minister that the United States will continue its full support to the democratically elected Government of Pakistan. The U.S. President also reiterated his support for Pakistan's courageous position and efforts on the Afghanistan issue.

The expression of best wishes by the United States to the democratic Government of Pakistan is really a good omen, but the Government of Pakistan should bear in mind that the United States views Pakistan's peaceful atomic program with doubts and suspicions, and tries to put pressure on Pakistan from time to time. It does not maintain a uniform policy with Pakistan and India in this regard; it is one-sided. Maintaining Pakistan's friendly relations with the United States, Prime Minister Benazir Bhutto should also make efforts to make the United States adopt a realistic attitude toward the atomic programs of Pakistan and India and revise its previous position. We have confidence that being a leader of a people's elected government and a person of political wisdom, she will be successful in convincing the United States of this step. [passage omitted]

Official on Talks With USSR for Atomic Plant

BK1603160389 Islamabad Domestic Service in Urdu
1500 GMT 16 Mar 89

[Text] Talks are being held between Pakistan and the Soviet Union for acquiring an atomic reprocessing plant to overcome the energy problem in the country. Speaking to newsmen in Lahore today, the minister of state for

production, Raja Shahid Zafar, said this. He said that, during the recent visit of the Soviet foreign minister, the prime minister had discussions with him on this issue. The Soviet foreign minister had assured that his government would consider this issue. He said he will lead a high-level delegation to the Soviet Union by the 2d week of May for more talks in this connection.

Plan To Exploit Afghan Uranium Alleged
*NC1203133089 Moscow Radio Peace and Progress
in Persian to Iran 1530 GMT 11 Mar 89*

[Unattributed commentary]

[Text] According to a report in the Indian newspaper PATRIOT, the Pakistani espionage organization has set up a special committee which is engaged in analysis of the composition of strategic materials for implementing the country's nuclear program. Pakistani experts have reached the conclusion that the establishment of an Afghan-Pakistani confederation will prove extremely advantageous in this regard. With the confederation, the path for the utilization of Afghanistan's uranium would be opened up.

We may remind you that in July last year the Asian mass media reported that Western experts, including some from Israel, had infiltrated into Afghanistan and discovered uranium mines in the Jowzjan and Faryab provinces of Afghanistan. It may be recalled that the illegal use and smuggling of this strategic material began with the reports by Pakistan's espionage services and the participation of some members of the Hezb-e Islami Party of Afghanistan headed by Gulbuddin Hikmatyar. The specially packaged uranium was transported to Pakistan through clandestine routes and on pack animals. Part of it was conveyed to Israel with the assistance of the Pakistani espionage services.

Meanwhile, the leaders of the country's (?opposition) organizations were unaware of Islamabad's anti-Afghan policy and this secret collusion, the price for which they were paying with their own blood. As a result, Tel Aviv purchased stolen uranium ore from Pakistan and Islamabad received arms and experts for an undeclared war against its neighbor. The Zionists also accorded special assistance to Pakistan to provide for its nuclear needs.

However, one day 'Aamer Akbar [name as received], one of the commanders of the Hezb-e Islami units, discovered the address to which the strategic raw material was to be sent in the district under his control and he then (?understood the matter). As is obvious, it was the address of the location of Israel's biggest nuclear center. 'Aamer Akbar drove out all the foreign experts from the area in which the uranium was being extracted and halted its production, because, according to him, uranium was being sent from there to the most wicked

enemy of Islam and all the Muslims. It may be added that Washington, Israel's strategic ally, was the source of the arcane cooperation between the militarists of Islamabad and Tel Aviv.

Washington provides arms and funds to Israel and Pakistan. The U.S. FBI organization has allocated \$100 million for the training of Afghan terrorists on Pakistani soil and for the undeclared war against their compatriots. As was reported by the Asian mass media, U.S. experts have recently shown immense interest in the natural wealth of the Afghan people, such as the mines of strategic raw materials and rare elements such as chromium, [word indistinct], vanadium. It may be asked whether Washington wishes to recover all its few million in expenses, which are being used for the support of the Afghan extremists on Pakistani soil and for economic and military aid to Pakistan, by means of a Pakistan-Afghan confederation.

In such circumstances, the confederation of Pakistan and Afghanistan would be beneficial for the Americans for other reasons as well. As is believed in Washington, the establishment of this confederation would help consolidate the U.S. position in South Asia and increase the possibilities for exerting pressure on India and on Iran's foreign policy. What is of even greater importance is that it would open up the path for access to Afghanistan's strategic raw material reserves for the Americans.

Yes, the implications are even more extensive, and once again these events expose (?the sincerity) of those who defend the freedom and the cause of Islam in Afghanistan, and on the other hand act on the basis of their own avaricious and (?ulterior) motives and continue to expand their interference in the internal affairs of the country.

Nuclear Effort Defended; 'No Intention' for Bomb
46000111z Karachi DAWN in English 11 Feb 89 p 7

[Article by Mohsin Ali]

[Text] [Boxed item: All evidence indicates that Pakistan is not engaged in a nuclear weapons-manufacturing programme... Pakistan's nuclear plans are geared to peaceful purposes. They are so above board that the country has offered a string of proposals designed to eliminate nuclear proliferation.]

Prime Minister Benazir Bhutto has reiterated her Government's commitment to the development of nuclear energy for peaceful purposes.

Speaking at the commissioning of the 400 mw Kot Addu power plant, the Prime Minister declared that there should be no doubt and misunderstanding regarding Pakistan's nuclear programme which was for peaceful purposes only.

"When we say peaceful, we mean it and exclude the development of nuclear weapons," she stressed.

Gratefully acknowledging the financial and technical assistance extended by France and the Federal republic of Germany in making the Kot Addu project a reality, the Prime Minister said it demonstrated the value of international co-operation in meeting energy requirements of the developing countries.

She urged the industrialised nations to come forward and help Pakistan in building nuclear power plants for the purpose of overcoming its chronic energy shortage.

"Perhaps nowhere in the world is the need for nuclear energy as grave as in Pakistan keeping in view its rising population, the soaring expectation of the people and the hopelessly inadequate sources of conventional energy," she remarked.

She said nowhere in the world is the commitment to peaceful uses of nuclear energy and the goal of non-proliferation as great as in Pakistan.

Pakistan's need for nuclear power generation is glaringly obvious. Natural gas, for instance is a valuable chemical feedstock in the fertilizer industry and its purely thermal use in power generation ought to be minimised.

Thus the only realistic option for power generation in Pakistan, according to experts, are coal, hydel and nuclear. Coal can only make a minimal contribution on account of its low quality and small quantity. By the year 2000, coal-fired stations are estimated to give us a total of a mere 1000 kw. As for hydro, the existing installed capacity is 2550 mw and another 27000 mw are planned for construction. By then, the more favourable sites would be exhausted and it would be unrealistic to expect more than 7000 mw of hydro capacity by the turn of the century.

Hence even if Pakistan were to press into service for power generation, 3000 mw or so, the country would still be faced with a massive shortfall of 8000 mw by the year 2000, assuming a moderate 5.1 per cent growth per annum in the Gross Domestic Product (GDP).

The only technically proven and economically viable source to meet this shortfall is nuclear energy.

Pakistan has slowly developed the basic infrastructure in terms of technology, manpower, research and development (R&D) facilities and operating personnel for embarking upon such a nuclear programme.

According to Mr Munir Ahmed Khan, Chairman of the Pakistan Atomic Energy Commission, the latest assessment of Pakistan's electricity needs, carried out in collaboration with international consultants, indicates that if the total power generating capacity is to reach 18,000 mw by the year 2000 (corresponding to a GDP growth of

the order of 5 per cent per annum), the required nuclear component would have to be at least 5000 mw. This means that Pakistan would have to commission over the next two decades or so as many as five power reactors of 1000 mw each.

Pakistan's nuclear programme has to be viewed against this backdrop. Indeed, it was in the context of this pressing energy needs of Pakistan that the Government of Pakistan approved—and in fact invited tenders—for the first plant of the series. This is to be the 900 mw nuclear power station CHASNUPP to be erected at Chashma in the north on the bank of the Indus River.

However, the nuclear suppliers club, led by the United States has successfully dissuaded all suppliers from bidding for the tenders. And so no tender has come and the Chashma nuclear power plant is yet to see the light of day.

This despite the fact that the Chashma plant would operate under the full scope safeguards and inspection of the Vienna-based United Nations Nuclear watchdog body, the International Atomic Energy Agency (IAEA).

The Karachi Nuclear Power Plant (KANUPP), it may be added, also operates under the full-scope safeguards of the International Atomic Energy Agency (IAEA). KANUPP's 187 mw reactor and the fuel rods, and cooling tank are under the round-the-clock surveillance by specially mounted IAEA television cameras. Moreover, IAEA Inspectors from Vienna pay periodic visits to KANUPP to ensure the plant's compliance with the IAEA full-scope safeguards regimen.

Apart from KANUPP, the only other functional reactor in Pakistan is the five mw research reactor at the Pakistan Institute of Nuclear Science and technology near Islamabad. This reactor too operates under the IAEA full-scope safeguards.

At Kahuta, not under IAEA safeguards, Pakistan has embarked on a modest programme of uranium enrichment to the extent of 3-5 per cent. Weapons grade uranium requires 70-90 per cent enrichment which Pakistan is not attempting. It has not got the sophisticated equipment required for weapons grade uranium enrichment. Kahuta is a R & D project to gather experience and train personnel for the Chashma plant which would operate on enriched uranium, unlike KANUPP which runs on natural uranium heavy water moderated.

The Government of Pakistan has repeatedly emphasised that it neither has the resources nor the intention to produce nuclear weapons.

Even the Reagan Administration with its vast intelligence network has been certifying every year so far that Pakistan does not possess a nuclear device. This year, according to WASHINGTON POST such a certificate may not be forthcoming. The paper said the Reagan

Administration informed the Congress before it left office that the United States was unlikely to be able to certify this year that Pakistan does not possess a nuclear bomb.

Without such certification required annually by law, Pakistan would not be eligible to receive United States economic and military aid beyond the current fiscal year.

The Reagan Administration budget for the fiscal year 1990 includes a request for 621 million dollars assistance to Pakistan as part of 4.02 billion dollar six-year package.

According to the POST story, the Reagan administration officials had told law-makers privately that Pakistan was so close to building a bomb that "it had been a very close call" to renewing the certification last year.

"They (Reagan Administration) made the decision that they are not going to be able to certify again" the POST quoted a Congressional source as saying.

In fact, Pakistan is today as far from building a bomb as it was last year or ever was. Pakistan today, as its Government has said, has not got the bomb. What is more, it has no intention of building one.

If Pakistan indeed is a "bomb in the basement" there was no reason to hide it. It would have openly crowed about it as a proud accomplishment by our scientists and technicians.

But all evidence Pakistan has supplied indicate that the country is not engaged in a nuclear weapons manufacturing programme.

True Pakistan is enriching uranium. But it is not weapons grade enrichment. Moreover, Pakistan is not the only country that is enriching uranium. In fact, there are about a dozen or so countries in the world that are today engaged in uranium enrichment without producing nuclear weapons. These countries include Japan and West Germany.

Furthermore, if Pakistan has the bomb, why would it be so eager and anxious to stop nuclear proliferation in the region? And why would it offer its nuclear facilities and installations to inspection on a reciprocal basis?

A country with a clandestine nuclear weapons programme would not adopt this straightforward course of action to have its plants inspected.

In fact, Pakistan's nuclear programme is geared entirely to peaceful purposes. It is so above board that the country has offered in the regional context a string of proposals designed to eliminate nuclear proliferation from South Asia.

Pakistan has bent all its energies against the possession, manufacture and use of nuclear arms in the region. Only two years ago, Pakistan proposed a nuclear test-ban treaty with India. Since the nuclear proliferation problem is a regional one, Pakistan to make clear its intention has proposed a number of regional solutions.

Any one of these solutions would serve the broad objective of nuclear non-proliferation—the aim the United States Administration is said to have in view. There is, for instance, Pakistan's offer for the declaration of the region (South Asia) as a nuclear weapon-free zone—an offer endorsed by an overwhelming majority of the United Nations every year since 1974, the year India exploded her nuclear device close to the Pakistan border.

Pakistan also suggested that India and Pakistan jointly sign a solemn declaration proclaiming their intention to renounce the acquisition or manufacture of nuclear weapons.

Yet another proposal offered in this connection is that the nuclear installations and facilities of both India and Pakistan should be open to mutual inspection to ensure that nuclear energy is not being diverted to purposes other than peaceful. After all, only last December during the fourth Summit of SAARC (South Asian Association of Regional Co-operation) at Islamabad, the Prime Minister of India and Pakistan signed a formal treaty not to attack each other's nuclear facilities and installations.

They can go a step further and open each other's nuclear installations to mutual inspection to eliminate doubts and suspicions. Pakistan has also suggested that both India and Pakistan place their nuclear facilities under the full-scope safeguard of the IAEA.

Finally, Pakistan has formally proposed that in order to banish mutual fear and suspicion, India and Pakistan should simultaneously sign the Non-Proliferation Treaty (NPT).

The point here to note is that this kind of all-embracing cast-iron, binding agreement would not be offered by any country "about to build a bomb" or having a clandestine nuclear weapons programme.

Moreover, Pakistan has repeatedly stated that if this series of proposals is not acceptable, she would like to consider any better suggestion India or the U.S. may have to lift the spectre of nuclear weapons from South Asia.

After all, the goals of nuclear non-proliferation on which the new Bush Administration is said to be so keen is being squarely met by these proposals.

**Minister Claims To Have Been 'Misquoted' on
Atomic Plant**
*BK1703163689 Islamabad Domestic Service in English
1600 GMT 17 Mar 89*

[Text] The minister of state for production, Raja Shahid Zafar, has clarified that he has been misquoted in a section of the press as having said that agreements have been reached between Pakistan and the Soviet Union on the supply of an atomic reprocessing plant. In a statement in Islamabad today, the minister said this was not true. What he had said was that Pakistan is in need of assistance to overcome its energy problem and it would welcome such assistance from any quarter.

Editorial Commends Successful Missile Tests
*BK2802124989 Karachi DAWN in English
13 Feb 89 p 7*

[Editorial: "Defence Production"]

[Text] The successful testing of two Pakistan-made guided missiles is a matter of tremendous significance for this country and for the region in which it is located. Coinciding with this momentous development, there are reports about plans being afoot to undertake indigenous production of tanks and jet aircraft. These are indicative of a significant advance in the manufacture of modern defence equipment. An ever-greater measure of self-reliance in defence production is a crucial factor in enhancing the country's capacity to defend its national sovereignty and territorial integrity. Given Pakistan's geopolitical location, the country can ill-afford to ignore the imperatives of national defence.

Preparedness here means not merely the armed forces' adequacy, both quantitatively and qualitatively but also a reasonably self-reliant armaments industry geared to our needs. At least two of Pakistan's Third World neighbours, India and China, have highly developed armaments industries producing sophisticated weapons and equipment. India, for instance, has not only tested its short-range guided missiles, but is pressing forward with the development of IRBMs [intermediate range ballistic missiles] with a range of 2,500 kilometres. One reason why India has reached this stage has been its insistence from the very beginning that any contract for joint ventures with a foreign agency for the assembly of armaments must provide for their eventual local production.

Today India is in a position to manufacture a wide range of defence items, including tanks and jet aircraft, with plans in hand for the manufacture of submarines and aircraft carriers. Where indigenous production is concerned, our achievements have been modest by comparison. The disastrous results of the policy of dependence

became evident in the context of the 1965 war when the United States cut off the supply of spare parts and for a long time thereafter maintained a freeze on defence supplies to this country.

It seems that in the aftermath of the 1971 war, the risks inherent in such a policy were realised and attempts were made to develop the basic infrastructure for an indigenous arms industry. The results of these efforts were seen in the expansion of the Pakistan Ordnance Factories, the setting up of a tank rebuild factory at Wah, the establishment of an aeronautical complex at Kamra and an aircraft assembly plant under licence from Sweden, besides several other projects with the assistance of friendly countries, especially China, France and Turkey. The testing of the two types of guided missiles and rocket launchers and the plans for the production of tanks and jet aircraft seems to indicate a forward stage in the process aimed at progressively achieving self-sufficiency in arms manufacture.

However, it must be understood that a full-scale defence industry is not within easy reach of a Third World country like Pakistan, especially when weapons systems are known to become obsolete in a matter of years. Resource constraints, the absence of a sound industrial infrastructure, a narrow scientific and technological base and negligible spending on R&D [research and development] inhibit any plans for a rapid development of defence production. Yet, given Pakistan's defence imperatives, we have no choice but to develop an arms industry, relying on our own resources but where possible in cooperation with friendly countries.

Given the Muslim world's technological backwardness, joint defence ventures are difficult, though not impossible. At least two other Muslim countries—Egypt and Turkey—have a relatively high level of industry and technology, and Iran, too, has shown some ingenuity in defence production during the Gulf war. Given the common perception these countries have of several international problems, it is but natural that these countries should come closer to each other in such a vital field as defence production.

Pakistan could play a major role in setting up joint defence ventures. But our neglect of science and technology has cost us dearly. Even though Pakistan has produced a few scientists of international repute, the output of scientists and engineers in our educational and training institutes is far below our minimum requirements. Besides, a big chunk of the scientific talent leaves the country in search of better professional opportunities elsewhere. This great shortcoming in our educational system must be rectified if we want to ensure a regular supply of trained scientific manpower for our national development efforts, including defence.

International Reactor Safety Seminar in Ukraine
LD2802101489 Moscow TASS in English
0939 GMT 28 Feb 89

[Text] Kiev February 28 TASS—An international seminar, which opened at the Rovno atomic power station (western part of the Ukraine), is centred on the need for further enhancing the safety of atomic electric power stations equipped with VVER-440 reactors. The seminar is attended by atomic power plant directors and leading specialists from Bulgaria, Hungary, GDR, Cuba, Poland, USSR, Czechoslovakia, and Finland, the countries that use such reactors.

The first VVER-440 reactors were put into operation at the Rovno atomic power station almost 10 years ago. They laid the beginning to a new series of basic reactors that are now used not only in the USSR but also in the CMEA member countries and Finland.

“We have lately been frequently hosting foreign colleagues at our station,” Rovno atomic power station director Vladimir Korovkin told TASS. “The personnel of our station had, for instance, useful meetings with U.S. power specialists—members of the Soviet-American Coordination Civil Reactor Safety Commission.”

The participants in the seminar will hear reports by scientists and specialists from atomic power stations of a number of countries. They will also get acquainted with the station.

Power Plant Council of Directors Formed
LD0203172689 Moscow World Service in English
1600 GMT 2 Mar 89

[Text] An international seminar involving heads of nuclear power stations of the countries of the Council for Mutual Economic Assistance and Finland has been held at the nuclear power station near the city of Rovno in the Ukraine. Experts from Bulgaria, Hungary, the German Democratic Republic, Cuba, Poland, the USSR, Czechoslovakia, and Finland exchanged information about the safety of their stations and decided to form a council of directors of nuclear power plants.

Commenting on the move, the director of the Dukovany nuclear power station, Jiri Golec of Czechoslovakia, said participants in the seminar had decided to set up the council because advantages of nuclear power engineering could be realized and accepted by humanity only if the safety norms were strictly observed.

Official Denies Plans for Voronezh Waste Site
PM0103162589 Moscow PRAVDA (Second Edition)
in Russian 1 Mar 89 p 1

[Interview with A. Voropayev, chairman of the Voronezh Oblispolkom, by “our correspondent” V. Stepnov under the rubric “Following Traces of Rumor”: “Chernozem Lands Will Remain Clean”; first two paragraphs are PRAVDA introduction; date and place of interview not given]

[Text] Any information about nuclear power engineering in Voronezh is received with avid attention. This is

understandable: One atomic power station is operating 40 km from the city and another is being installed 5 km from the city. The Voronezh people have recently been actively discussing the possible construction of a regional storage facility for atomic power station waste on the territory of the oblast. There has not been a word in the press about this project but in the city it is accepted as a fact. What is happening? Are there grounds for the talk? And if there are, why does the public not have reliable information?

Our correspondent V. Stepnov put these questions to A. Voropayev, chairman of the Voronezh Oblispolkom.

[Stepnov] First of all, Aleksey Makarovich, let’s specify our terminology. Many people associate the waste from atomic power stations with used nuclear fuel, which is far from the same thing.

[Voropayev] Indeed, used nuclear fuel is kept at the station for only a little while and is then sent to the sector’s appropriate enterprise for processing. We, however, have in mind radioactive waste formed in the process of the station’s operation. This can mean the products of water treatment, rags, oils, special clothing, or components left over after the repair or preventive treatment of equipment. The Novovoronezhskaya AES stores only its own waste.

[Stepnov] Where does this talk come from? Reliable, respectable people nominated as candidate deputies are promising their voters to include in their programs the struggle against the creation of a storage facility. Perhaps its creation is being planned?

[Voropayev] I can state categorically and unequivocally that it is not. But your question requires a more thorough reply. I shall begin with a short digression into history. Back in May 1986 the USSR Ministry of Power and Electrification asked us to allow engineering and geological work in the region of the Novovoronezhskaya AES to find areas suitable for burying atomic power station waste. We refused this request and asked that this burial not be planned here. Nonetheless in December of last year the USSR Ministry of Nuclear Power Generation asked the obispolkom to give permission for the construction of an experimental industrial regional enterprise for the burial of radioactive waste. Having examined the materials submitted we did not accept the ministry’s proposals. It was decided to decline the request.

[Stepnov] But what motivated the refusal?

[Voropayev] Right now there are 42 chemically dangerous establishments on the territory of Voronezh Oblast. They include the Rossosh chemical plant and a synthetic rubber plant. A 320-km section of the Tolyatti-Odessa ammonia pipeline passes through our oblast. There are plans to construct an area for burying toxic waste from the oblast’s industrial enterprises. How many dangerous

establishments can be implanted into the chernozem? From here the country receives a large proportion of sugar, grain, meat, and milk. We do not have the right to subject the agricultural produce obtained here to the risk of pollution. The main thing is that the Voronezh chernozem lands are priceless. However science and technology may progress, man will always be fed from the land and we should not squander it. Our successors will not forgive our wastefulness, however important the establishments erected. Ultimately there is nothing more important than bread.

[Stepnov] In conclusion, Aleksey Makarovich, do you not believe it is necessary to expand the population's provision with information? It is immoral to keep secret from people what affects their health, welfare, and very lives.

[Voropayev] I agree. We must restructure ourselves. Glasnost and democracy are not empty words but mean real respect for public opinion.

CANADA

Possible Export of Ontario Tritium to U.S. Stirs Debate

Leak of Government Document

51200020 Toronto *THE TORONTO STAR* in English
15 Feb 89 p A30

[Article by Olivia Ward]

[Text] The Ontario government should support sales of the radioactive tritium gas to international governments and industry, says a cabinet document.

The document was leaked to Energy Probe and is labelled "cabinet submission proposal and recommendation."

It urged the province to "support Hydro's efforts to the world fusion research community and selected industrial customers" and to "work with Hydro to develop a strategy that will maximize tritium-based industrial development in Ontario."

Norm Rubin, Energy Probe nuclear research director, said he didn't know the source of the document, dated 28 December 1988. His organization is an anti-nuclear lobby group and it receives about 85 per cent of funding from individual donations.

At a new conference yesterday, critics from several peace groups said tritium is a vital ingredient of modern nuclear weapons, and that any sale to weapons-producing countries would boost the arms race.

But Energy Minister Bob Wong denied that the paper was discussed by the cabinet and said that no tritium sold in Ontario would aid the nuclear arms race.

Tritium is a byproduct of the nuclear-power process.

Aside from its use to trigger and increase the power of nuclear weapons, the gas is used in medical research, drugs and a growing array of commercial products—such as illuminated signs and airport runway markers. But it has been shown to cause cancer.

The Darlington nuclear plant, east of Oshawa, will begin to produce tritium at the end of this month, and will become one of the world's biggest suppliers of the gas within the next five years.

The \$126 million plant will extract tritium from heavy water used in CANDU reactors to make the disposal of radioactive waste less hazardous. Because tritium decays rapidly, it doesn't have the same long-term storage problems as other kinds of nuclear waste.

But critics said that the short life of the gas is creating a crisis in U.S. weapons production.

"This document doesn't take into account the most important fact," said Rubin. "The U.S. shortage of tritium is now a front page issue. That makes it especially urgent that it not go on the world market."

Rubin and peace group members said they were not worried about sales to the Pentagon. But selling tritium to any American buyers would allow the American government, which is the only U.S. supplier of tritium, to reserve more of its own supplies for the military, they said.

Rubin added that Ottawa's export controls won't stop even doubtful sales of tritium.

"The Ontario government can't take it for granted that federal guidelines will prevent misuse. What they say is that any of the rules can be set aside if the minister approves.

GLOBE AND MAIL Editorial

51200020 Toronto *THE GLOBE AND MAIL*
in English 16 Feb 89 p A6

[Text] The alchemists of long ago who dreamed of turning base metals into gold never contemplated a substance that would fetch almost 2,000 times the price of gold. The modern alchemists of Ontario Hydro, on the other hand, know how it's done and are keenly aware that they can make about \$70-million a year doing it. As export possibilities go, tritium is in a class by itself.

The main purpose of the Darlington nuclear plant near Toronto is to produce electrical power, but it will yield between 2.4 and 4 kilograms of tritium a year as a byproduct. A five-year-old could pick it up in one hand. You can understand the interest in doing business with a product that is in excess of domestic need, easily transportable, much sought after and carrying a price that suddenly doubled a few months ago. (The Savannah River Plant in South Carolina, which has been the sole producer of tritium for the U.S. military, was closed because of safety and management problems.)

Why should there be any hesitation about jumping in with exports when the market conditions are so favorable to Canada? The answer lies, of course, in tritium's important function as the trigger for nuclear warheads, and awareness that most of it, by far, serves this purpose. A relatively small portion goes into scientific research or the manufacture of road signs that show up readily in the dark.

Canadians do not like the idea of helping nourish the weapons of mass destruction. That is why there are rules about the export of uranium and the sale of reactors to countries that show eagerness to join the nuclear club. We would recoil instinctively from the idea that Canada might nudge the Armageddon clock closer to midnight.

Is that why would happen if we sold tritium to the United States? Hardly. The notion that we might reduce the U.S. nuclear defence arsenal by starving it of tritium is laughable. It has been suggested that even if our tritium didn't go directly into a warhead, it might free other tritium for that purpose. This echoes an earlier contention that Canada's export of trucks to the United States allowed that country to send more of its own trucks to Vietnam.

Those who make the decision of tritium exports should be wary of such shallow arguments.

Views Given on Nuclear Submarines After Cabinet Change

Hope of Opponents

51200016 Toronto *THE GLOBE AND MAIL*
in English 31 Jan 89 p A3

[Article by Ross Howard: "Beatty Move Gives Hope to Opponents of A-Subs"]

[Text] Ottawa—Peace and disarmament groups heralded the transfer yesterday of defence minister Perrin Beatty into the health and welfare portfolio as a sign that the government has decided to scrap its controversial program for nuclear-powered submarines.

"With Beatty gone the government is able to review not only the submarine program but the entire hawkish agenda he advocated," Ish Theilheimer, president of Operation Dismantle, said yesterday.

"We are happy to see Beatty gone," Sheena Lambert of the Canadian Peace Coalition said, despite not knowing whether the new Defence Minister, William McKnight, is a strong advocate of the plan to buy 10 nuclear submarines, announced almost two years ago at a cost estimated then at \$8-billion.

Prime Minister Brian Mulroney, in unveiling his new cabinet yesterday, rejected reporters' suggestions that Mr. Beatty's transfer from the military portfolio to one focused on daycare, health standards and pensions represents an abandonment of the submarines.

The transfer does not suggest a change in priorities, "I just decided it was time for a change in these ministries," he said.

"The government is still committed to the policy that was set out in the White Paper." However, Mr. Mulroney added, "like everything else (the policy) will be reviewed, no doubt," by the new cabinet.

Mr. Mulroney said the cabinet will review "all of the various programs and initiatives in light of the fiscal realities."

View of Proponents

51200016 Toronto *THE GLOBE AND MAIL*
in English 1 Feb 89 p A4

[Article by Ross Howard: "Nuclear Sub Proponents Believe Plan Still Afloat"]

[Text] Ottawa—Industry proponents of an \$8-billion program to acquire nuclear-powered submarines say they do not believe the government plans to sink the scheme even though Perrin Beatty has been transferred out of the Defence portfolio.

"We accept that there may be some delay (in announcing who will build the submarines)" as a result of Monday's cabinet shuffle, said Lawrence Herman, president of SNA Canada, the consortium promoting a French-designed submarine.

"Reasonable delay does not concern me," Mr. Herman said yesterday, noting that Prime Minister Brian Mulroney said the submarine program will be reviewed, along with all others, as part of the new cabinet's response to tighter financial conditions.

Mr. Herman's competitor, Jock Allen, of the British-based VSEL Defence Systems Canada, responded with a stiff upper lip to the sudden disappearance of the submarines' most fervent backer in the latest shuffle.

Mr. Mulroney moved Mr. Beatty to the Health and Welfare portfolio, a post more likely to place the minister arguing in the cabinet for defence cuts to pay for day care or pensions.

Discounting celebrations among peace and disarmament groups of the first signs of an end to the submarine program, Mr. Allen said Monday that Mr. Beatty's departure means a delay while the new minister, William McKnight, is "brought up to steam" on the program.

However, industry sources say Mr. McKnight is an unknown commodity on major military expenditures and that the move of Mr. Beatty more likely than not signals Mr. Mulroney's intention to put the submarine proposal to renewed debate in a cabinet facing pressure to cut spending.

Several sources noted that the Prime Minister said Monday that the program is being reviewed, rather than saying the government plans to adhere to the 1985 white paper and the timetable calling for rapid acquisition of the submarines.

After a year of analysis, the Defence Department has completed its assessment of the two competing submarines and is ready to recommend one to the cabinet. However, since last summer the government has delayed calling for the recommendation.

The program to acquire eight to 12 submarines over the next 25 years was unpopular with more than 60 per cent of those surveyed in a Gallup poll this month. The government avoided discussing it during the federal election campaign.

Discussion of Alternatives

51200016 Toronto *THE TORONTO STAR* in English
3 Feb 89 p A28

[Article by Ron Lowman: "Course Unclear for Canadian Subs Program"]

[Text] Canada's submarine program is in the spotlight once again, with the appointment of new Defence Minister Bill McKnight and the creation of a new, powerful cabinet expenditure review committee.

Prime Minister Brian Mulroney's new committee is expected to set one of three courses for the navy's \$8-billion nuclear-powered submarine program:

- Give it a full-speed-ahead toward a decision on 10 British Trafalgar-class boats, or 12 of the smaller, cheaper French Rubis-Amethystes (Canadian version). Cut the number and costs of nuclear-powered boats by a third, or half, and hope to add more some years down the road. Cancel the project and revert to the principal alternative—six extra surface frigates and a dozen diesel-electric submarines—which would cost the taxpayers \$800 million more than the 10-12 nuclear-powered subs.

The feeling among senior officials who met McKnight, 48, the day after his appointment is that he's pretty positive about the program as outlined in the Progressive Conservatives' 1987 white paper and "apparently has no mandate to kill it."

Mulroney created the expenditure review committee to control spending and cut the government deficit. By replacing Perrin Beatty in the defence portfolio with McKnight, he set off speculation that the submarine project was dead.

Star sources could not predict a time frame for a committee decision on the program and would say only that much would depend on "the kind of pressure Mulroney gets from the French and the British governments."

Any cuts—to acknowledge the current arms reduction climate and the need to slim the government's huge deficit—would be hailed by peace and disarmament groups.

Little Effect

But any approved program would have an "infinitesimal" effect on the deficit in the life of the present government, one source said, because the big money for submarines would not have to be paid out for six or seven years.

The Canadian plan is to spread payment of the \$8 billion—critics insist the program will cost much more—over 27 years at \$300 million a year.

"Our previous scenario was for six extra (surface) frigates for \$4 billion, plus 12 purely diesel-electric subs for \$4.8 billion," said one expert, who asked not to be identified. "That adds up to \$8.8 billion."

Two batches of six frigates (small destroyers) have already been approved and funded, and are under construction in New Brunswick and Quebec.

A decision on whether to buy British or French nuclear-powered subCmarines was delayed by November's federal election and now by the cabinet shuffle and the creation of the expenditure review committee.

Mulroney has said only that the plan is still government policy, but—like everything else—it will be reviewed by the new cabinet. During the election campaign, he endorsed the program.

The subject of the debate is a fully, nuclear-driven boat with a small reactor that proponents describe as just another way to boil water to produce steam to drive the propeller shafts. The advantages of such a boat are that it can operate at high speeds for long periods and stay submerged as long as the crew and food supply hold out.

The Canadian boats would operate—with surface frigates, helicopters and long-range patrol aircraft—across Atlantic and Pacific trade routes, with occasional forays under the ice in Canada's Arctic waters. Because they create their own atmosphere, such submarines would not need to surface, thus exposing a sub to satellite detection.

Diesel-electric boats have to surface regularly to recharge their batteries. Buying new ones, senior sailors say, would be like ordering propeller-driven fighters for the air force instead of jets.

Between the fully nuclear and the diesel-electric boats comes a hybrid. It has a touch of the nuclear, but as the expert put it, "all of them basically give you an extension of submerged time. But if you have to speed up, then you either have to surface to recharge the batteries, or spend valuable time loitering while a trickle charge does its stuff."

Among the hybrid ideas are a tiny reactor, such as one being developed by the ECS Group of Companies in Ottawa; a nuclear battery from Atomic Energy of Canada Ltd. (AECL); fuel cells; and a Sterling engine technique.

Safety Emphasis

ECS owner Greg MacDonald said his AMPS project (Autonomous Marine Power Source) would cost approximately \$50 million to \$60 million a copy and would run a 2,000-ton submarine at 22 to 26 km/h (12 to 14 knots, or nautical mph) continuously.

"It's a very small, relatively low-pressure and temperature, water-cooled reactor, which emphasizes safety and automation," he said.

A typical submarine, with the power source added, would cost \$250 million to \$300 million, MacDonald estimates. A French Rubis-Amethyste is around \$380 million and a British Trafalgar-class in the area of \$450 million.

MacDonald insists that the only drawback to a submarine fitted with the power source is that it wouldn't be able to run as fast as a fully nuclear boat.

"It boils down to whether Canada can afford a Cadillac, or a Chevy," MacDonald said.

None of the other hybrids—the AECL nuclear battery, the Sterling engine or the battery of high-powered fuel cells—can drive a boat as fast, or power all the massive sensors and communications equipment like the fully nuclear power plant.

"Our argument would be that the alternatives are just as expensive, if not more so, than the nuclear-powered submarine," said THE STAR's source. "Only the power plant is different. The rest—fire-control system, periscope, torpedoes and tubes—are all the same."

Meanwhile, Canada's brass and senior civil servants wonder what general approach McKnight—described as a hard-nosed, solid, decision-making Tory—will take to the defence portfolio.

So do the British and the French boat-builders who have been awaiting a decision for months.

VSEL (Vickers Shipbuilding and Engineering Ltd.) Defence Systems Canada and France's SNA Canada Inc. have spent millions promoting their boats and lobbying across Canada.

Public Opinion Poll

51200016 Toronto *THE GLOBE AND MAIL*
in English 6 Feb 89 p A4

[Article by Julia Nunes: "Seventy-One Percent of Canadians Oppose Subs Plan, New Poll Reveals"]

[Text] The federal government's plan to spend \$8-billion on nuclear-powered submarines is opposed by more than 70 percent of Canadians, according to a new public opinion poll.

The nation-wide poll, conducted by Angus Reid Associates for Greenpeace, indicates 59 percent of Canadians strongly oppose the submarine program. An additional 12 percent moderately oppose it.

Only one-quarter of Canadians support the purchase of the submarines, with 11 percent strongly in favor and 14 percent moderately in favor, the survey showed. Four percent of respondents offered no opinion.

The poll also showed that a majority of respondents would rather see the \$8-billion spent on the environment or on reducing the federal deficit, when offered the choice.

The release of the poll comes one week after a cabinet shuffle that shifted defence minister Perrin Beatty to the health and welfare portfolio—a move that peace and disarmament groups immediately heralded as an indication that the controversial submarine program would be scrapped.

Mr. Beatty was chief architect of the 1987 white paper that called for \$200-billion in defence spending over 15 years, including \$8-billion for 10 to 12 nuclear-powered submarines that could navigate under Arctic ice and also patrol Canada's east and west coasts.

William McKnight, who replaced Mr. Beatty as Defence Minister last week, said he supports the conclusions of the defence white paper.

Prime Minister Brian Mulroney also reiterated the government's commitment to the policies set out in the white paper, but he added that the new cabinet will review programs contained in the white paper, along with other government programs, "in light of the fiscal realities."

Some industry sources said a review could lead to renewed debate over the submarine program proposal by a cabinet facing pressure to cut spending.

The poll asked 1,503 Canadians the following question, in random telephone surveys across the country: "In a few weeks, the Conservative government is expected to

announce the final decision to purchase 10 nuclear-powered submarines at a cost of at least \$8-billion. Based on how you feel right now, do you support or oppose the purchase of these nuclear-powered submarines?"

Opposition to the purchase was strongest in Quebec, where 80 percent of those surveyed either strongly or moderately opposed the plan and only 17 percent supported it. In British Columbia, 73 percent were strongly or moderately opposed and 24 percent supported the purchase.

Atlantic Canada was the strongest pocket of support, with 44 percent either strongly or moderately in favor of the submarines. No region of the country had a clear majority supporting the plan.

A sample of this size should accurately reflect national opinion to within 2.5 percentage points 95 times out of 100. Regional results are less accurate because of the smaller sample size.

The poll also asked respondents if the \$8-billion should be spent on nuclear-powered submarines, on the environment, or on reducing the federal deficit. Only 9 percent said the money should be spent on submarines.

Fifty percent of respondents said the money should be spent on the environment. Another 35 percent said it should be used to reduce the deficit.

Among respondents who voted for the Progressive Conservatives in the last federal election, only 12 percent said the \$8-billion should be spent on nuclear-powered submarines. Forty-five percent of conservative Party voters said the money should be spent on the environment and 38 percent wanted it spent on reducing the deficit.

AECB Proposes To Pass On Regulatory Costs to Customers

51200019 Toronto *THE GLOBE AND MAIL*
in English 14 Feb 89 p B7

[Article by Robert Sheppard]

[Text] The federal agency that licences atomic reactors and the handling of radioactive material wants to charge its customers the \$24-million it currently spends carrying out these functions.

Part of Ottawa's most recent attempt at cutting costs, the bulk of the proposed new charges, at least \$14-million annually, will fall on utilities in Ontario, Quebec and New Brunswick and could add as much as 0.2 per cent to the electrical bills of consumers in these provinces, the Atomic Energy Control Board [AECB] estimates.

Ontario Hydro, which has the largest nuclear program in the country, would end up paying at least \$10.5-million a year if the proposed cost-recovery scheme were implemented. But the utility is not commenting on the proposal because it has not yet seen any details from the AECB.

The new plan, along with a partial list of fees, is set out in the current issue of an AECB newsletter. But because of a printing snafu, the detailed fee schedule that is to be sent out to the various clients has not yet been mailed.

In any case, the fee schedule and economic impact of the scheme may be outdated by the time it arrives.

The board recently announced its intentions to be a more aggressive regulator in the field of nuclear safety and has a plan to double its staff and licencing activities over the next few years, AECB spokesman Hugh Spence says.

In a few years time, the cost of licencing provincial reactors, uranium mines and fuel processors, research reactors and hospital systems, and private companies dealing in radioisotopes and radiography, could double to about \$48-million a year, Mr Spence says.

Under the new proposal, most or all of these costs would be borne by those being regulated, which could put the federal Crown agency in an apparent conflict of interest as it becomes more beholden to the nuclear industry for its budgets.

Mr Spence says there may be some legal and regulatory hurdles to be overcome in setting out the new measures. But the biggest problem from the board's point of view is the impact it will have on regulatory effectiveness.

"This introduces a bit of an adversarial thing that we have not had to date. If people are to be paying for these services, they may be more reluctant to be as forthcoming" with information and indirect assistance as they have in the past.

The AECB's analysis is that about half of the costs would be borne by the three provincial utilities with nuclear programs, with Ontario Hydro picking up about 75 per cent of these costs on an annual basis. The uranium mining and handling industry would bear about 25 per cent of the costs, and private companies and institutional researchers would take on the remainder.

The proposed fee schedule, which is to be debated within the industry over the next few months, would have the most impact on budget-strapped university and hospital research, and also on commercial radioisotope users, a group that mainly provides services to the oil and gas industry, the AECB study estimates.

FEDERAL REPUBLIC OF GERMANY

Nuclear Center Contacts With Pakistan

AU2802151389 Hamburg DER SPIEGEL in German
27 Feb 89 p 113

[Unattributed article: "Hot Laboratories"]

[Text] The Foreign Ministry is worried about contacts of the Karlsruhe Nuclear Research Center with the nuclear country Pakistan.

Every afternoon Cornelius Keller, 57, sat in his hotel in Islamabad and was bored. Granted, it was "elegant," the scientist says, but he "could not even get a beer." Therefore, Keller will "never again" go to Pakistan.

However, the business that the director of the nuclear technology school at the Karlsruhe Nuclear Research Center (KfK) had there every morning was more interesting. For a week, the professor, a plutonium expert, gave lectures at the Pakistan Institute for Science and Technology (Pinstech) near Rawalpindi on the "chemistry and technology of the nuclear fuel cycle."

In a nuclear factory not far from the lecture halls, the Pakistanis are building the Islamic bomb, and, therefore, the professor found his work in the spring of 1983 a bit touchy. He says that he was "deliberately careful" and that his "lectures were purely scientific." Whenever more far-reaching questions were asked, "I did not answer," and he never mentioned the word "plutonium."

Keller's reaction was also negative when his hosts wanted to show him the "hot cells" of the Pinstech laboratory. The professor preferred not to know exactly what method was being used in Rawalpindi, where about 20 kg of plutonium can be produced every year.

Keller's colleagues at the KfK have not always been as careful. According to findings of the Foreign Ministry, in the seventies Karlsruhe decisively helped to push Pakistan's nuclear program "by giving advice over several years on the planning and building of the large hot-cell facility."

Nuclear experts went to Rawalpindi time and again, submitted proposals on the touchy issue of setting up the laboratory, gave advice on the "treatment of radioactive waste," and supplied their Pakistani colleagues with various instruments, including a mass spectrometer.

In an attempt to explain the manifold relations between Karlsruhe and Rawalpindi, the KfK people said last week that these relations "exclusively served peaceful purposes." They said that the instruments that Pakistan has received "can be obtained on the open market." They added that only twice, "in 1974 and 1975," have

there been "contacts in the sensitive area." At the time, two Pakistani scientists studied "uranium enrichment according to the nozzle process" in Karlsruhe.

However, the colleagues of Pinstech were also always welcome subsequently. In the summer of 1977, one of them participated "actively in the layout and equipment of plants for the collection, handling, and treatment of radioactive waste in the hot cells" for 6 months. In addition, he was brought together with a producer of such plants. Another Pakistani carried out theoretical studies on the "recycling of fission products in nuclear reactors," using KfK computer codes.

When in 1976 Pakistan did not get fuel elements for the nuclear reactor supplied by Canada because it refused to sign the nuclear Nonproliferation Treaty, Karlsruhe again jumped into the breach: The Pakistanis were advised on "problems of fuel production."

However, summoned before the Bundestag Research and Technology Committee last Wednesday [22 February], KfK chief Horst Boehme did not find the technology and know-how transfer to Pakistan at all problematic. Boehme cited an agreement signed between Bonn and Islamabad in 1974 on "the peaceful use of nuclear energy." He said that the KfK only kept to the "given political bases."

Alarmed, the Foreign Ministry informed the Economics Ministry in the spring of 1983 that the KfK's aid for Pakistan was taking place "in a political area that touches on the nonproliferation of nuclear weapons." The diplomats demanded that it be made clear to the Karlsruhe scientists that they, too, have "to observe the Foreign Trade and Payments Law." In addition, they demanded that the center be subjected to "tighter institutional inspection."

The reason Genscher's ministry intervened was the fear that "because of the well-known thorough intelligence activities carried out by the United States," reports on Karlsruhe's aid for Pakistan might leak out. The Foreign Ministry was concerned that possibly the Americans have known for a long time that Pinstech "has received substantial support from Karlsruhe."

In December 1974, a Pakistani called N.A. Javed was at the Karlsruhe center. According to a report of Pakistani nuclear engineers, the man discussed with KfK scientists the planning of a "hot laboratory" in Pinstech. About 2 years ago, the Federal Intelligence Service reported that the "hot test runs in this reprocessing plant" represent "an important step on the road to setting up a plutonium production capacity also for military purposes."

Javed, who is now one of the directors of the Pakistan Atomic Commission, was also a business partner of the Gelnhausen-based New Technologies company, which is under suspicion of having been involved in illegal nuclear exports.

However, Javed apparently worked not only on the bomb program but also on his own account: If his German interlocutors wanted to meet him, they had to bring bank notes by the bundles.

Controls Tightened on Technological Exports

*LD1503221889 Hamburg DPA in German
1442 GMT 15 Mar 89*

[Text] Bonn (DPA)—As a result of the incident concerning German chemical exports to Libya, the Federal Cabinet today agreed upon tighter measures to prevent illegal technological exports in the military-strategic field. The Federal Economics Ministry and other ministries were instructed to draw up draft legislation to that end.

The measures already announced include making involvement in the manufacture of nuclear, bacteriological and chemical weapons a punishable offence—a stipulation which is extended also to Germans living abroad. In future violations are to be treated as a crime, punishable by sentences of between 2 and 15 years. Furthermore, the introduction of special compulsory registration and a change in the export lists in foreign trade law are planned. A decision should be reached by 11 April at the latest on staff increases in the monitoring and investigation authorities.

SWEDEN

Weapons Technology Export Controls Considered

*36500065y Stockholm DAGENS NYHETER in Swedish
17 Feb 89 p 6*

[Article by Bo G. Andersson]

[Text] The Swedish Government is considering the introduction of a number of control measures to prevent exports of chemicals and related technical apparatus that can be used to produce chemical weapons.

New legislation banning exports of missile engines and other technology for nuclear delivery systems is also currently in preparation at the Government Office.

This has been confirmed to DAGENS NYHETER by War Materiel Inspector Sven Hirdman, who is something of a key man in the preparatory work involved.

Secretiveness

The new export controls have been thrashed out within a restricted circle at the UD [Ministry of Foreign Affairs], the FOA [Defense Research Institute], the KMI [War Materiel Inspectorate], and the Customs Service. There has been very considerable secretiveness.

"We have no indications that Swedish industry has been exporting chemicals to chemical weapon plants abroad along the lines of the West German deliveries to Libya."

"What we have done is conduct an unprejudiced study of Swedish industry's production capacity with respect to both raw materials and technical apparatus that can be used to produce chemical weapons. We have a very competent industry, and we want to gather information on exports," Sven Hirdman told DAGENS NYHETER.

The work began long before the disclosure that West German firms had supplied a factory just south of Tripoli with equipment for producing chemical weapons.

From the Swedish standpoint, the big problem is that many of the chemicals used in nerve and mustard gases, for example, also have civilian uses, primarily as components of various insecticides.

Quick Action

Since chemical raw materials have that twofold application, it is not possible to control exports under current war materiel legislation. For a product to be classified as war materiel, it must be usable exclusively for military purposes.

DAGENS NYHETER has learned that very soon—within just a few weeks—the government will propose various measures for controlling exports of chemicals that can be used for both civilian and military purposes. The same applies, for example, to the boilers, distillation equipment, and filtering apparatus that are needed to produce the substances in question.

"Sweden is concerned by the spread of chemical weapons to the Third World, especially to areas of conflict such as Iran-Iraq. We, therefore, want to do our bit," says Sven Hirdman, who, in his capacity as head of the KMI, is ultimately responsible to Minister of Defense Sten Andersson.

Another area regarded by the Swedish Government as requiring very urgent attention is that of missile delivery systems and the related technology. Here, too, new legislative measures are expected in the very near future to gain control over Swedish exports.

Joint Action

In April 1987, seven Western powers—the United States, the FRG, Great Britain, France, Italy, Japan, and Canada—joined together in introducing export controls on missile delivery systems and similar systems capable of delivering nuclear warheads, chemical weapons, and conventional high-explosive charges.

That joint action by the seven states was directed against countries which have the capability for producing nuclear and chemical weapons but which may not have all the know-how required for producing delivery systems. This applies, for example, to India, Pakistan, Libya, Iraq, South Africa, Egypt, Argentina, and Brazil.

Israel is also on the list, but that country is considered to have its own capability thanks to the Jericho missile system that has been produced in recent years.

The list of products covered by the export controls introduced by the seven Western powers is a very long one. It covers everything from complete rocket systems to various fuels and, for example, the software used in navigation systems.

Space Technology

Many of those products are related to space technology and are manufactured by such Swedish firms as Saab, the Volvo Aircraft Engine Company, and the Swedish Space Corporation. Those firms will be affected by the legislation now being considered by the Government Office.

It is natural that Sweden should follow the Western powers and introduce similar control regulations. It can be viewed as a continuation of the many years of Swedish disarmament work in the area of nuclear weapons. But DAGENS NYHETER has learned that there are also other reasons why Swedish measures are urgent.

The firms in Sweden which manufacture products of this kind are dependent upon imports of certain key components from the United States and several of the other Western countries in that group of seven states. DAGENS NYHETER has been told by several sources that those deliveries will be in the danger zone if Sweden does not institute better controls over its own exports.

No Choice

The seven Western powers may halt sales to Sweden if they do not get guarantees from the Swedish Government that it is doing everything it can to gain control over its own exports. The government therefore has no choice, according to those sources.

DAGENS NYHETER has learned that the control measures will also be directed at brokers and other middlemen dealing in chemicals, missile delivery technology, and so on. The government is considering the possibility of doing exactly as it does in the case of exports of ordinary war material and requiring so-called end user certificates from the states buying these products from Sweden.

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